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Communications Server 1000
Engineering

> **Technical Configuration Guide
for Calling Line ID Configuration**

Enterprise Solutions Engineering
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Abstract

Calling Line ID (CLID) tables in the CS 1000 portfolio determine the CLID sent for the various types of call setups originating from both stations and calls tandemed via an inbound trunk. Specific configuration must be considered to present the appropriate CLID on various call types across both private and public network trunk facilities. In many areas around the world, CLID is also a key component for Emergency Services (911, 112, etc.) call routing and termination to the appropriate Public Safety Answer Point or PSAP. This document will cover the most common scenarios for CLID table creation and is designed to serve as an extension to the *ISDN Primary Rate Interface Features and Fundamentals NTP* **NN43001-569-B2**.

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1. Conventions

This section describes the text, image, and command conventions used in this document.

Symbols:

Tip – Highlights a configuration or technical tip.

Note – Highlights important information to the reader.

Warning – Highlights important information about an action that may result in equipment damage, configuration or data loss.

Text:

Bold text indicates emphasis.

Italic text in a Courier New font indicates text the user must enter or select in a menu item, button or command:

ERS5520-48T# *show running-config*

Output examples from Nortel devices are displayed in a Lucinda Console font:

ERS5520-48T# *show running-config*

```
! Embedded ASCII Configuration Generator Script
! Model = Ethernet Routing Switch 5520-24T-PWR
! Software version = v5.0.0.011
enable
configure terminal
```

2. CS 1000 Calling Line ID Configuration

Calling Line ID (CLID) tables in the CS 1000 portfolio determine the CLID sent for the various types of call setups originating from both stations and calls tandemed via inbound trunks. Specific configurations must be considered to present the appropriate CLID on various call types across both private and public network trunk facilities. In many areas around the world, CLID is also a key component for Emergency Services (911, 112, etc.) call routing and termination to the appropriate Public Safety Answer Point or PSAP. This document will cover the most common scenarios for CLID table creation and is designed to serve as an extension to the *ISDN Primary Rate Interface Features and Fundamentals NTP* **NN43001-569-B2**.

ISDN trunking is required in order to transmit CLID with a call setup over a digital facility such as a PRI or PRI2 (E1). Analog trunks do not have the ability to transmit a CLID to the network. The only exception to this is a CAMA trunk, typically used only in the US, and becoming rarer with the open availability of ISDN digital facilities. CAMA facilities are used are used in some cases for E911 implementations, as they do transmit CLID information in the form of MF digits in-band with the dialed destination. A complete list of supported interfaces is shown in Table 1.

	Euro ISDN	MCDN	Q.SIG	BRI Phones	DPNSS	MFC	DTI2	Analog
Calling Line ID Support	YES	YES	YES	YES	YES	NO	NO	NO

Table 1: Trunk Interfaces Supporting CLID

2.1 Feature Packaging

The Calling Line ID feature requires:

Integrated Services Digital Network (ISDN) Package 145

☠	**IMPORTANT NOTE** **CLID table configuration has a significant impact on all calls placed to Emergency Service Numbers defined in the Call Server (911, 112, etc.).** **Special attention must be given to these call scenarios to be absolutely certain that Emergency Calls are not negatively impacted by CLID table misconfiguration.** **Failure to do so could threaten the safety of users and/or property.**

3. CLID Table Implementation

This section will cover the creation and implementation of CLID tables in the CS 1000. It is assumed that the user is working with digital ISDN facilities already provisioned and functional.

3.1 LD 15 - Enable CLID Tables for a Customer

CLID Tables are defined in Overlay 15 in the NET_DATA block. By default, the CS 1000 will support up to 256 CLID tables; however, this can be expanded by increasing the LD 15 SIZE prompt to any number up to 4000 as shown in Figure 1 below.

```
>LD 15
REQ: CHG
TYPE: NET
TYPE NET_DATA
CUST 0
OPT
AC2
FNP
CLID YES
  SIZE 4000              < Denotes maximum numbers of CLID tables available
  INTL
  ENTRY
ISDN
  VPNI
  PNI
  PINX_DN
  MBG
  BSGC
  PFX1
  PFX2
  HLOC
```

Figure 1: Command Line Interface CLID Table Configuration in LD 15
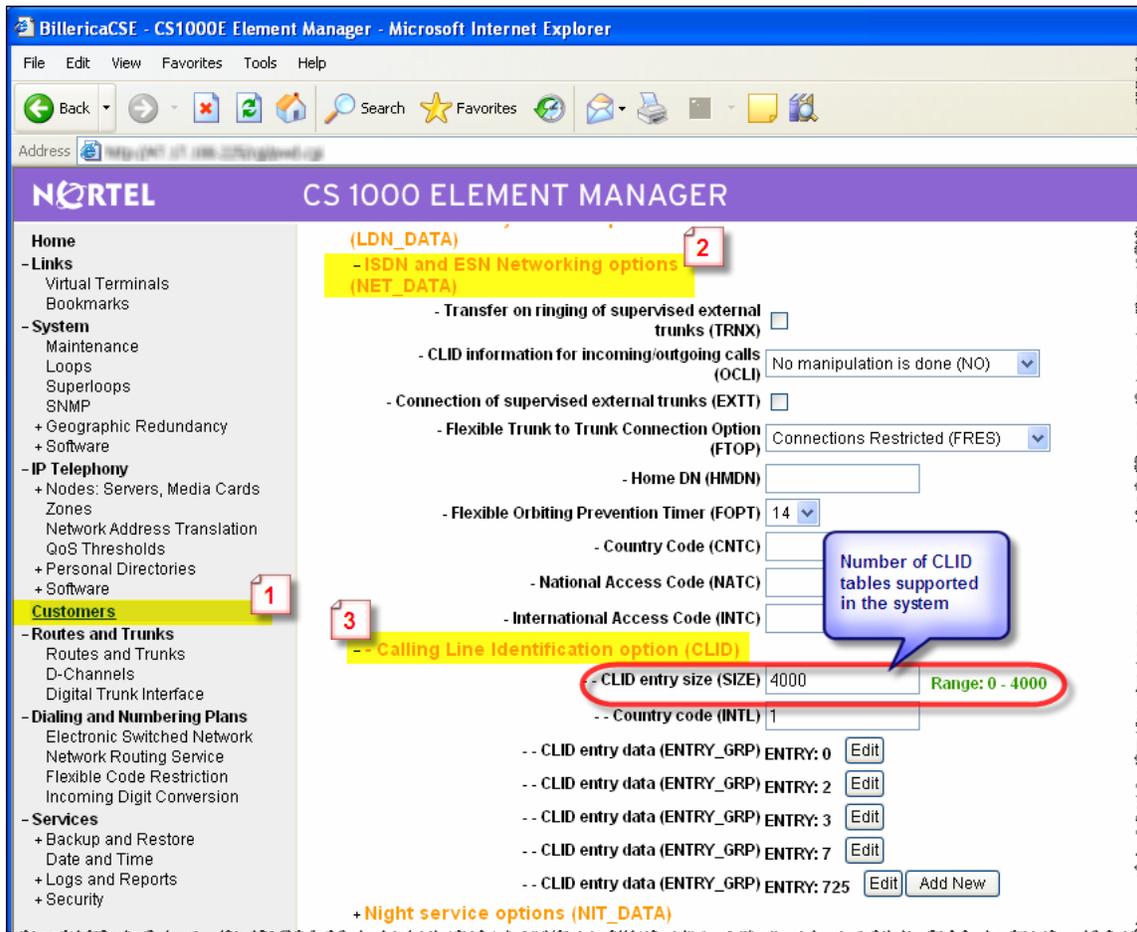
Figure 2: Element Manager CLID Table Configuration in LD 15

3.2   LD 15 - Creating CLID Tables

Once the CLID table function has been enabled for a customer, individual CLID tables to be used by stations and trunks must then be created. CLID tables are numbered from 0 to 4000, or the maximum number defined in the previous step. Once created, CLID tables are assigned to keys on each telephone TN.

When provisioning DNs on telephones, if no CLID table is specified, the default CLID table of '0' will be used. Because of this, Nortel strongly recommends that CLID Table 0 be defined to send the Main Billing Number of the customer with no DID number conversion. This will prevent sending an invalid CLID to the PSTN on non-DID telephones where the installer fails to provision a specific CLID table number on a key as well as provide a fail-safe solution for 911 calls.

<table>
<tr><td>👍</td><td>

BEST PRACTICE

Configure the default CLID Table '0' to send the main Billing Number for PSTN and Emergency Services Calls. This will prevent sending an invalid CLID to the network in the event a CLID is omitted on a particular phone.
</td></tr>
</table>

Specific scenarios for CLID configurations will be covered later in this document. CLID Tables apply to all DN keys on all phone types including analog and ACD agent phones.

```
REQ: CHG
TYPE: NET
TYPE NET_DATA
CUST 0
OPT
AC2
FNP
CLID YES                        < CLID Gate Opener
  SIZE
  INTL
  ENTRY 0                       < CLID Table to be modified/created
    HNTN 972                    < All Calls - NPA (Area Code)
    ESA_HLCL 362                < Emergency Calls - NXX (Local Exchange)
    ESA_INHN YES/NO             < Emergency Calls - Include NPA on CLID
    ESA_APDN YES/NO             < Emergency Calls - Include DN on CLID
    HLCL 362                    < Normal Calls - NXX (Local Exchange)
    DIDN YES/NO                 < Normal Calls - Include DN on CLID
    HLOC 442                    < UDP Calls - Home Location Code
    LSC 2                       < CDP Call - Local Steering Code (if used)
```

Figure 3: Command Line Interface CLID Table Creation in LD 15

3.2.1 Detailed Prompt Explanations

Detailed explanations for the prompts and responses are shown in the table below.

Prompt	Response	Description
- - - HNTN	**0-999999** **X**	National code (Area Code) for home national number (1-6 digits). Using **X** deletes digits when making a change to an existing table.
- - - HLCL	**0-999..9** **X**	Local code for home local number or Listed Directory Number (1-12 digits). Using **X** deletes digits when making a change to an existing table.
- - - DIDN	**(YES)** **NO** **SRCH**	**YES** The default. The CLID is constructed using the digits defined in HLCL followed by the DN of the active key. **NO** Construct the CLID using the digits defined in HLCL. **SRCH** Search on the phone, from key 0 - upwards, to find a CLID entry which has the DIDN set to YES. Use the found CLID to construct the local number.
- - - HLOC	**0-9999999** **X**	Home location code (ESN), 1-7 digits. Using **X** deletes digits when making a change to an existing table.
- - - LSC	**0-9999999** **X**	Local steering code, 1-7 digits. Using **X** deletes digits when making a change to an existing table.

Table 2: CLID Table Detailed Prompt Explanations
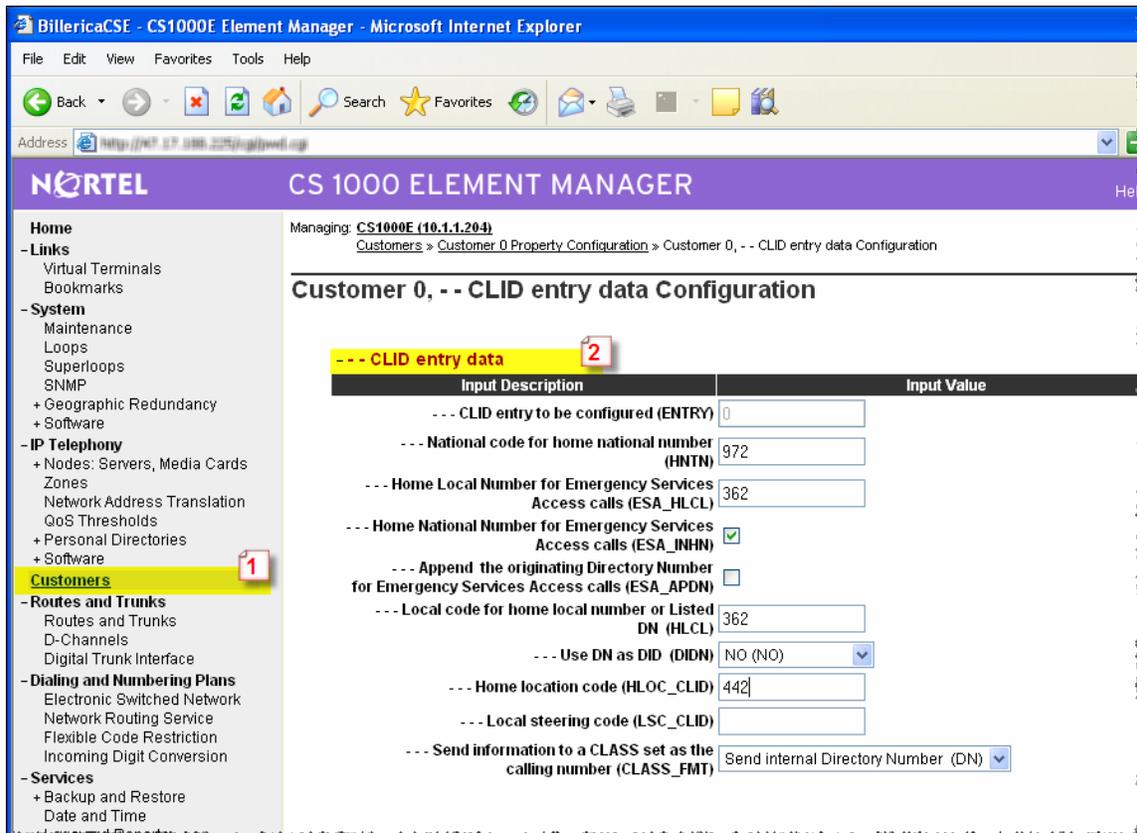
Figure 4: Element Manager CLID Table Creation in LD 15

3.3   LD 10 - Assign CLID to analog phones

CLID tables are assigned to analog devices in Overlay 10 using a field added after the DN in the DN prompt in the TNB. Since analog devices can only have a single DN, only one CLID table can be assigned to these devices.

```
REQ:  NEW
TYPE: 500
TN    4 0 6 0
CDEN
DES   1B68F2
CUST  0
WRLS
DN    5745 3                  < CLID Table 3 will be used for calls
```

Figure 5: Command Line Interface CLID Table Assignment for Analog Devices

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3.4   LD 11 - Assign CLID to Digital and IP Phones

CLID tables are assigned to digital and IP telephones in Overlay 11 using a field added after the DN in the DN prompt in the TNB. Due to the fact that digital and IP telephones may support multiple DN appearances CLID table assignment must be carefully planned to prevent an invalid CLID from being sent to the network, potentially jeopardizing emergency response.

3.4.1   Multiple DNs on a Single Device

In many cases, multiline telephones have several DNs appearing on them, most commonly rollover lines or internal soft numbers that are not DIDs. If the same CLID table were used for DID DN keys on the phone as rollover keys, an invalid CLID would be sent to the network since in most cases the rollover DN range is not part of the normal DID range.

To solve this issue, a special CLID Table identifier of 'D' can be set on all other DN appearances other than the Primary DN. This special CLID identifier causes the Call Server to start searching all keys on the phone starting at Key 0 for a valid CLID table to use. The CLID is then assembled as if the call were placed from the PDN key.

In the example below, CLID table 2 would be used along with the DN of 5745 regardless if the call were made from Key 0 or Key 1. This configuration is critical for Emergency Services calling, where the CLID determines the proper routing and termination to the appropriate PSAP.

See section 3 of this document *"Common CLID Table Usage Examples"* for a more detailed description of how to use the Default CLID Table, or multiple CLID tables on a single telephone.

```
REQ:  NEW
TYPE: 2XXX / 39XX / I200X / I2050
TN 4 0 6 0
DES  8B369G
. . .
. . .
KEY 0 SCR 5745 2             < CLID Table 2 is used for calls on this key
   MARP
   CPND
   VMB
   ANIE
KEY 1 SCR 2225745 D          < DEFAULT Table is used for calls on this key
   MARP
   CPND
   VMB
   ANIE
```

Figure 6: Command Line Interface CLID Table Assignment for Analog Devices

3.5   LD 16 - Assign CLID to Trunk Routes

CLID tables can also be assigned to trunk routes to provide a CLID on inbound non-PRI facilities such as TIE lines. Although the CLID cannot be assigned to the station level of the remotely connected Call Server, the CLID can be configured to indicate the entire remote site as a whole. This CLID table can also be used for PRI trunk routes when the originating Call Server fails to compile and send a CLID with a call setup.

```
TYPE RDB
CUST 00
ROUT 2
DES  SIP
TKTP TIE
. . .

. . .
ACOD 8022
TCPP NO
TARG 01
CLEN 1                   < CLID Table 1 is used for inbound calls without CLID

. . .

. . .
CAC_CIS 3
AACR NO
```

Figure 7: Command Line Interface CLID Table Assignment for Trunk Routes

3.6   LD 20 - CLID Verification Report

The CLIDVER CLID Verification report was added to the CS 1000 in Release 4.0 to enhance the tracking of CLID table usage by stations on the system. Primarily designed for confirming ESA CLID settings, the report produced includes all CLID formats used by each key on each TN for various call types for verification.

3.6.1   CLIDVER Short Report by TN

```
REQ: PRT
TYPE: CLIDVER
SORTBY  TN
ESAONLY  NO
SHORT   YES
TN  96 0 0 0


TN            KEY    DN      ZN  CTYP  CLID                  RT  CALLED#

096 0 00 00 00 ACD 3999    010 911   C 6137251000          002 911
                               NATL    6137251000
                               INTL    16137251000
                               UDP     3999
                               CDP     3999
096 0 00 00 03 SCR 3654    010 911   C 6137251000          002 911
                               NATL    6137251000
                               INTL    16137251000
                               UDP     3654
                               CDP     3654
096 0 00 01 00 SCR 3655    000 911   C 3655                002 911
```

Figure 8: CLIDVER Short Report by TN

3.6.2 CLIDVER Long Report by TN

```
REQ PRT
TYPE:
TYPE CLIDVER
SORTBY  TN
ESAONLY  NO
SHORT   NO
TN   96 0 0 0


CUST 0
DES  CSE4FL
TN   096 0 00 00  VIRTUAL
TYPE I2004
CDEN 8D
ESA
   ESDN  911
   ESRT  2
   DFCL  6137253000
   DDGT  911
   OSDN  3655
ZONE
   ZONE#   10
   ZESA  DIS
KEYS  00 ACD 3999
   CLIDENTRY   0
   HNTN  613
   ESA_HLCL  7251000
   ESA_INHN  YES
   ESA_APDN  NO
   HLCL  7251000
   DIDN  NO
   HLOC
   LSC
   CLASS   DN
CLID
   CTYP  CLID              RT  CALLED#
   ESA   C 6137251000      002 911
   NATL    6137251000
   INTL    16137251000
   UDP     3999
   CDP     3999
   CLASS   DN
CLID
   CTYP  CLID              RT  CALLED#
   ESA   C 6137251000      002 911
   NATL    6137251000
   INTL    16137251000
   UDP     3999
   CDP     3999
```

Figure 9: CLIDVER Long Report by TN

3.6.3 Release 5.0 CLIDVER Enhancements

CS 1000 Release 5.0 brings additional enhancements to the CLIDVER command in alignment with new feature functionality added in the Emergency Services for Client Mobility module. These CLIDVER enhancements include:

- Location denoted by ERL instead of Zone

- Support for Multiple ESDNs

- Support for Dynamic ELIN

- Support for Enhanced Routing (RLIs, LTER)

- Printing of Called Number

3.7 Modification of CLID at Call Time

At times, the user is required to modify the CLID format at the time of the call due to certain carrier requirements.

In general, if a user dials a 7-digit public number that is resolved in NARS/BARS as an NXX, the system will compile and send a 7-digit CLID in the form of NXX-XXXX. When dialing a 10 or 11 digit number that resolves in NARS/BARS as an NPA, a 10 digit CLID will be sent using the format NPA-NXX-NXXX.

In some states where 7-digit local dialing is still permissible, the carrier still requires the CLID to be sent as 10 digits. This is easily corrected at the time of call processing by using a Digit Manipulation Table in the Route List Index entry. In addition to their ability to modify digits dialed by the caller, DMI tables also have the ability to modify the call type of the call being sent.

Create a DMI in LD 86 that only modifies the call type to NPA for NXX dialed calls. When the call type is modified, the Call Server compiles the CLID based on the new call type forcing the CLID to a 10-digit format. The table below shows how a DMI is created for call type modification only. Once created, this DMI can be assigned to the appropriate Route List index that handles this call type.

```
>LD 86
ESN000

MEM AVAIL: (U/P): 18988591     USED U P: 5891187 112986     TOT: 24992764
DISK SPACE NEEDED: 142 KBYTES
2MB BACKUP DISKETTE(S) NEEDED: 1  (PROJECTED LD43 – BKO)
REQ   NEW
CUST  0
FEAT  DGT
DMI   900
DEL
ISPN
INST
CTYP  NPA
```

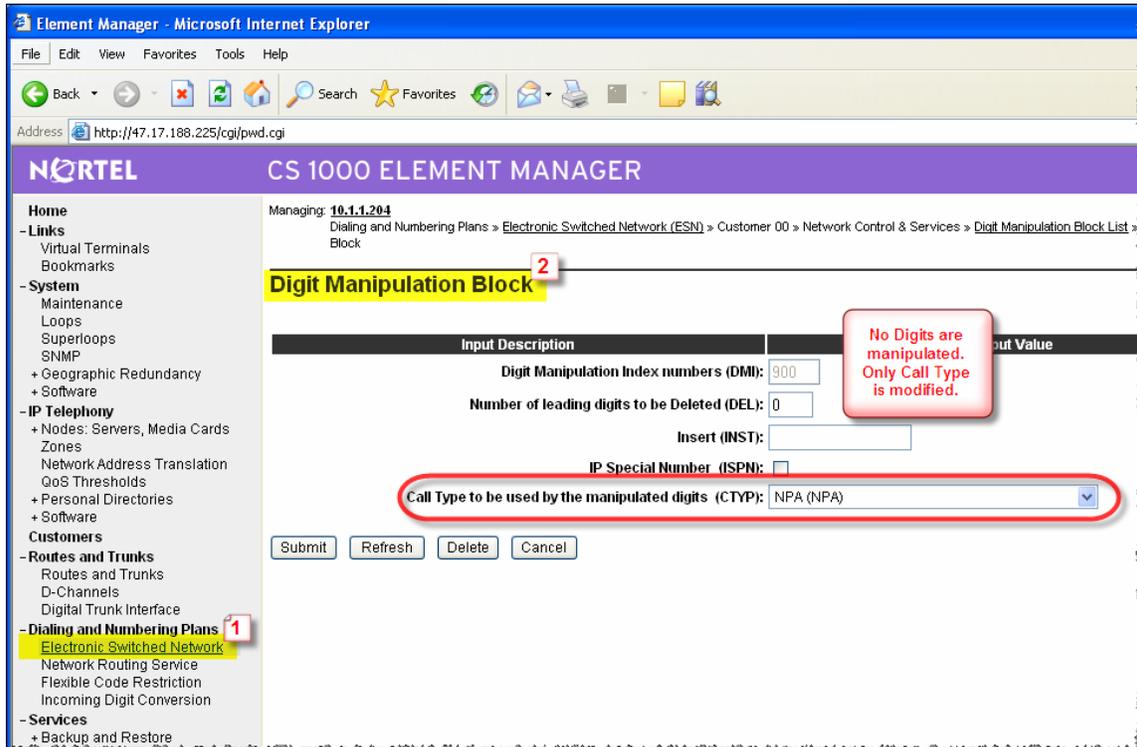**Figure 10: Command Line Interface DMI Call Type Modification**

Figure 11: Element Manager DMI Call Type Modification

4.   Common CLID Table Usage Examples

This section will cover some of the more common CLID configuration examples found in customer networks. In addition to normal call flows, Uniform Dial Plan (UDP), Coordinated Dial Plan (CDP) and ESA call CLID compilation will be covered.

4.1   System Wide CLID Table Usage

Although the CS 1000 will support up to 4000 individual CLID tables, quite often only a handful of tables are required for the bulk of the users. All users who fall under the same CLID composition rule can use the same table.

4.1.1   Common Tables

4.1.1.1   Send Main Number (LDN) for all Calls Including ESA calls.

This is the best practice use for CLID Table 0 since this table will be used if no CLID table is referenced on a particular DN key. In most cases users have not previously implemented CLID tables therefore all DNs on the system are already set to this table. If CLID Table 0 was previously used for other scenarios, by modifying this to send the LDN for all calls, most CLID problems are immediately averted. Station specific information is not sent to the network; however, the system no longer will send any erroneous CLID information.

When implementing CLID for ESA calls, this provides an immediate resolution to the issue of sending erroneous CLID. Users now have an opportunity to correct station specific CLID as maintenance windows permit.

CLID Table 0	
HNTN	972
ESA_HLCL	3625000
ESA_INHN	YES
ESA_APDN	NO
HLCL	3625000
DIDN	NO
HLOC	442

KEY	DN	CLID Table
KEY 00	5745	0
KEY 01	2225745	D
KEY 02	N/A	N/A
KEY 03	N/A	N/A
KEY 04	N/A	N/A
KEY 05	N/A	N/A

Table 3: Send Main Number (LDN) for all Calls Including ESA Calls

4.1.1.2   Send DID Number for all Calls Including ESA Calls

This example is one that is likely to be appropriate for many DID stations on the Call Server. It sends the user's DID number for both Normal and ESA calls giving station level ESA reporting

CLID Table 1			KEY	DN	CLID Table
HNTN	972		KEY 00	5745	1
ESA_HLCL	362		KEY 01	2225745	D
ESA_INHN	YES		KEY 02	N/A	N/A
ESA_APDN	YES		KEY 03	N/A	N/A
HLCL	362		KEY 04	N/A	N/A
DIDN	YES		KEY 05	N/A	N/A
HLOC	442				

Table 4: Send DID Number for all Calls Including ESA Calls

4.1.1.3   Send LDN Number for all Calls EXCEPT ESA Calls

This CLID Table configuration allows a user to maintain anonymity for regular calls sending out the LDN for the system, however station level resolution is achieved by sending the DID only for ESA call traffic.

CLID Table 2			KEY	DN	CLID Table
HNTN	972		KEY 00	5745	1
ESA_HLCL	362		KEY 01	2225745	D
ESA_INHN	YES		KEY 02	N/A	N/A
ESA_APDN	YES		KEY 03	N/A	N/A
HLCL	3625000		KEY 04	N/A	N/A
DIDN	NO		KEY 05	N/A	N/A
HLOC	442				

Table 5: Send LDN Number for all Calls EXCEPT ESA Calls

4.2   Multiple User DNs on a Single Device

This is typical of a station which has multiple users' DNs appearing on a single telephone.

4.2.1   Requirements

- Primary user's DN to be used for CLID on calls from user's keys
- Secondary user's DN to be used for CLID on calls from secondary user's keys
- ESA calls to use user's DID DN for ESA reporting on all keys

4.2.2   Programming

This solution requires multiple CLID Tables to be assigned to this particular telephone to obtain the desired results. The 'D' option can only be used on the primary user's rollover number. If this option were to be used on the keys containing the secondary user's DN, the primary user's DID would be sent for CLID on normal calls. The following tables show how a special CLID table is created for the secondary user's DNs on this particular telephone.

CLID Table 1	
HNTN	972
ESA_HLCL	362
ESA_INHN	YES
ESA_APDN	YES
HLCL	362
DIDN	YES
HLOC	442

KEY	DN	CLID Table
KEY 00	5745	1
KEY 01	2225745	D
KEY 02	N/A	N/A
KEY 03	N/A	N/A
KEY 04	6150	51
KEY 05	2226150	51

CLID Table 51	
HNTN	972
ESA_HLCL	3625745
ESA_INHN	YES
ESA_APDN	NO
HLCL	3626150
DIDN	NO
HLOC	442

ⓘ	**Notice of how CLID Table 51 was used for the secondary** user's **DN keys to hard code both the Normal and ESA CLID compilation algorithm to send the desired information from these keys.** **This solution required using a standard system CLID table (Table 1) for the primary user, and a special purpose built CLID table (Table 51) for the secondary user keys.** **This table will most likely** be uniquely assigned to **this particular TN on the system, although may be reused by others requiring the same CLID treatment.**

5.   Software Baseline

This document is applicable to:

- **Meridian 1 Release 25.40**

- **Meridian 1 Release 25.40b**

- **Succession Release 3.00**

- **CS 1000 Release 4.00T**

- **CS 1000 Release 4.50W**

- **CS 1000 Release 5.00W**

6. Reference Documentation:

Document Title	Publication Number	Description
ISDN Primary Rate Interface	NN43001-569-B2	Features and Fundamentals

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