

Overview of Switch Integration with Digital Station Interface

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Overview

Integration of the Northern Telecom (Nortel) Meridian 1 switch with the Lucent™ INTUITY™ system requires that a digital station interface circuit card be installed in the Lucent INTUITY platform. With the digital station interface, these switches can be integrated with the following Lucent INTUITY multi-application platforms (MAPs):

- MAP/40
- MAP/40P
- MAP/100
- MAP/5P

Purpose

This chapter provides background information necessary to integrate a Lucent INTUITY system with a Nortel Meridian 1 switch using a digital station interface circuit card.

Method of Integration

Switch integration refers to the sharing of information between a messaging system and a switch to provide a seamless interface to callers and system subscribers. A fully integrated messaging system answers each incoming telephone call with information taken directly from the switch.

Digital Station Interface Circuit Card

To integrate with Meridian 1 switch, the Lucent INTUITY system uses as an interface a VoiceBridge-PC (VB-PC) digital station interface circuit card. This circuit card is responsible for interacting with the switch to provide call information and manage message waiting indicator (MWI) updates.

Ports

The digital station interface circuit card has eight ports. Each port emulates a proprietary digital station (telephone set). The emulated digital station forms the key link between the Lucent INTUITY system and the switch for obtaining the call information when the call is forwarded to the Lucent INTUITY system.

Station Emulation

For integration with Meridian 1 switch, the digital station interface circuit card emulates the Nortel model 2616 digital station. The ports on the digital station interface circuit card can have various keys, such as call appearance keys and other feature keys, configured similarly to the keys on an actual digital station.

The 2616 digital stations have displays that show fields indicating the calling party (CLI) number, the called party (CP) number, and the reason for call redirection, if redirection has taken place. These displays provide the call information necessary for integrating the switch with the Lucent INTUITY system. The application programming interfaces (APIs) that come with the digital station interface circuit card enable the station display to be read.

Hunting

One of the features of the Meridian 1 switch used to route calls to the INTUITY AUDIX® system is *hunting*. A single *hunt chain* is created that contains extension numbers corresponding to the Tip/Ring lines connected to the Lucent INTUITY system. These extension numbers are mapped, one to one, to the keys of the ports on the digital station interface circuit card. The first Tip/Ring extension number in the hunt chain is assigned as the Lucent INTUITY message retrieval number. The remaining members of the hunt chain are a set of contiguous extension numbers beginning with the second Tip/Ring extension. Whenever the Lucent INTUITY message retrieval number is called, the switch attempts to connect to the first extension number in the hunt chain. If the first extension is busy, the switch attempts to connect to the second extension number, and so on until the

switch obtains a free extension number in the hunt chain. The switch terminates the call on the first available port. The search for a free extension number in the hunt chain is called *hunting*.

Systems with More Than 16 Tip/Ring Lines

A limitation of the hunting feature on the Meridian 1 switch determines how the Lucent INTUITY system makes use of hunting. These switches allow hunting of only 16 channels, whereas the Lucent INTUITY system platforms can support as many as 64 channels, with one channel mapped to each Tip/Ring line.

For systems with more than 16 Tip/Ring lines, the lines are divided into groups, with each group containing 15 (or fewer) members. Each group is associated on the switch with an automatic call distribution directory number (ACD DN). Hunting among the groups is accomplished by use of a linking ACD DN in the hunt chain.

Primary and Bridged Call Appearances

The method of setting up extension numbers for the integrations with Meridian 1 switch is called *bridging*. The Tip/Ring port appearances are called the *primary call appearances*, while the various keys of the ports on the digital station interface circuit card having the same extension numbers are called *bridged call appearances*. The switch rings both these appearances when a system subscriber dials a particular extension number.

[Figure 1-1](#) illustrates the configuration used to simultaneously ring the primary and bridged call appearances. Each Tip/Ring port on the Lucent INTUITY system is connected to the switch through an analog line as an analog station. Each of the ports on the digital station interface circuit card is connected to the switch as a digital station through a digital line. For every extension of the Lucent INTUITY Tip/Ring ports a corresponding line appearance key on the emulated digital station on the digital station interface circuit card port is configured.

All system subscribers have forwarding on no answer and busy to the first number of the hunt chain. When a call lands on a port, both the primary call appearance and the bridged call appearance are rung. The Lucent INTUITY system senses a ring event on one of its Tip/Ring lines, while the driver on the digital station interface circuit card simultaneously senses a ring event on the corresponding key. The switch integration software obtains the display details pertaining to this call, parses the data, and derives the necessary call information.

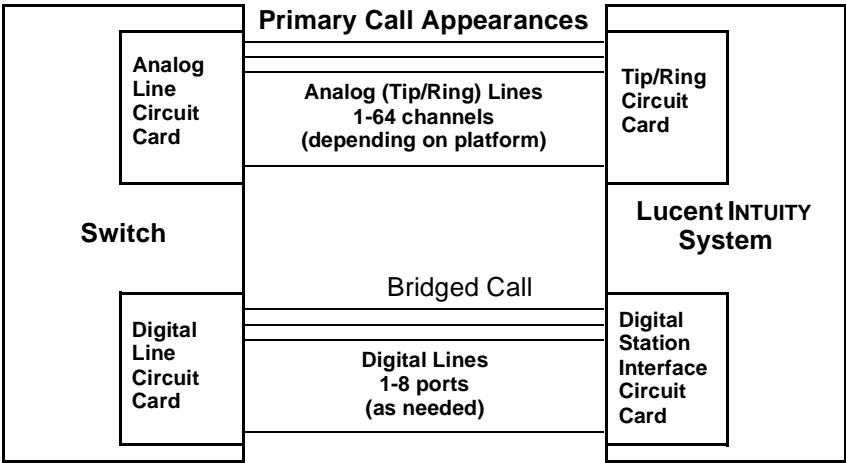


Figure 1-1. Lucent INTUITY System and Switch Connectivity for Integration

External calls are differentiated from internal calls by the presence of a data string for the CLI. The reason for redirection is decoded from data in another string. Since the Tip/Ring lines on the Lucent INTUITY system are mapped one-to-one to the keys on the port of the digital station interface circuit card, the display information can be mapped to the corresponding Tip/Ring port on which the call lands. The Tip/Ring line channel number is sent to the Lucent INTUITY system.

Message Waiting Indicator Updates

MWI updates are also performed using the 2616 digital station features. Two keys of the 2616 digital station, called the message indication key (MIK) and the message cancellation key (MCK), are configured on each of the ports of the digital station interface circuit card. By using the MIK or MCK key features, the MWI, (whether it is a light or a stutter tone), is turned on or off, respectively. The driver on the digital station interface circuit card provides information about whether the MWI update was successful.

One port on the digital station interface circuit card (normally, port 8) is dedicated for MWI updates, regardless of how many ports are necessary for Tip/Ring line mapping. A unique extension number is assigned for this port, which need not be contiguous with the extension numbers assigned for the Tip/Ring lines. No hunting is done for MWI updates, and the extension number assigned for MWI updates is not part of the hunt chain.

Demarcation Points

Lucent service technicians dispatched for Lucent INTUITY system installation cannot make direct connection to or perform administration on switches that are not maintained by Lucent personnel or entities. The demarcation point for systems using the digital station interface circuit card is the end of the Lucent-provided connector cables. See [“Connectivity”](#) in [Chapter 3, “Requirements and Administration for Nortel Meridian 1”](#). Lucent services personnel may, however, connect the Lucent-supplied cables to the digital station interface circuit card installed in the Lucent INTUITY system.

For additional information concerning the extent of the installation, see the contract between the customer and Lucent Technologies.

Joint Acceptance Testing

Joint acceptance testing is to be executed by both the customer representative and the INTUITY AUDIX® on-site installer when the integration includes Lucent Technologies products and customer-provided equipment. Acceptance testing is performed at the end of an installation to demonstrate to the customer that the integration is operational. The purpose of joint acceptance testing is to have knowledgeable people available to test and resolve issues before final completion of the service order.

Lucent INTUITY Features and Functionality Supported

Listed below are Lucent INTUITY features and functions supported in integrations with a Meridian 1 switch:

- Call forward to personal greetings
 - Internal
 - External
 - Busy
 - No answer
 - Out-of-hours
- Transfers (blind transfers only)
 - Escape/return to operator (0)
 - Subscribers
 - Dial extension (*T)
 - Dial by name (*A)
- Message notification

- Outcalling
 - MWI updates
- Private networking configuration with multiple switches behind a single Lucent INTUITY system
- Applications
 - INTUITY AUDIX
 - Lodging
- INTUITY AUDIX networking
 - High-speed digital networking (DCP)
 - TCP/IP networking
 - AMIS analog
- Fax messaging

Lucent INTUITY Features and Functionality Unsupported

Hunting of multiple hunt groups is *not* supported. Therefore, configurations cannot be implemented whereby Tip/Ring lines are dedicated for some Lucent INTUITY feature or application, such as the Lucent INTUITY Lodging application or an automated attendant.

Integration Performance

- The average MWI update time is approximately 5 seconds. The time may increase under heavy switch load and if the Lucent INTUITY system has a number of invalid subscriber mailboxes.
- The average call answer delay is approximately one ring. The delay may increase under heavy traffic on the switch or the Lucent INTUITY system. See [“Switch Hardware Requirements”](#) in [Chapter 3, “Requirements and Administration for Nortel Meridian 1”](#).
- MWI updates to members in an automatic call distribution (ACD) group are not supported when a message is delivered to an automatic call distribution directory number (ACD DN). Therefore, in systems where shared mailboxes are used, MWI updates cannot be performed on the various stations that access the shared mailbox.
- Transfers in a networked switch configuration may take longer than in a non-networked configuration.
- Automated attendant setup for call routing to external locations takes longer for completing the call and may require additional switch setup.

- A small percentage of calls may be answered in an unintegrated mode during a very heavy traffic condition. The NT8D02 digital line circuit card performs better than the QPC578 card. See [“Switch Hardware Requirements”](#) in [Chapter 3, “Requirements and Administration for Nortel Meridian 1”](#).)
- Disconnects are slower and less reliable for systems with switch software Release 15 and Release 16 than with Release 17 and greater because the switch does not provide disconnect supervision with the earlier releases. See [“Switch Software Requirements”](#) in [Chapter 3, “Requirements and Administration for Nortel Meridian 1”](#).

General Configuration Requirements

- Contiguous extension numbers are assigned to the Tip/Ring ports of the Lucent INTUITY system from the second tip/ring port onwards.
- The voice ports are divided equally among the ports on the digital station interface circuit card used for integration.
- As a general rule, no more than nine voice ports should be mapped to a port on the digital station interface circuit card.
- If MWI updates are to be performed on the system, a port on the digital station interface circuit card must be dedicated to this function.
- The digital lines that are to connect to the ports on the digital station interface circuit cards in the Lucent INTUITY system must be from different digital line circuit cards on the Meridian switch, preferably from digital line circuit cards in slot 0 or slot 1. This arrangement distributes the traffic across the digital line circuit cards and gives high priority for the ports.

Checklist for Switch Integration

The following checklist ([Table 1-1](#)) outlines sequentially the process of integrating the Lucent INTUITY system with a Meridian 1 switch. It is assumed that you are performing the integration as part of installation of the Lucent INTUITY system and completing the procedures specified in the system installation book for your platform.

The switch integration software package should already be installed on your system before you begin. To verify that the correct software is installed, see information on the View Installed Software window in the maintenance book for your platform. The window should list the following:

VB-PC DRIVER and SWIN Software

If you need to install the software, see Chapter 9 (for MAP/5P) or Chapter 8 (for all other platforms), “Installing the Switch Integration Software Packages,” in the maintenance book for your platform.

Table 1-1. Checklist for Switch Integration with Digital Station Interface

Task	Description	Reference	✓
1.	Administer the switch.	Chapter 3, "Requirements and Administration for Nortel Meridian 1" . Information in Chapter 2, "Planning for Switch Integration with Digital Station Interface" , is also needed.	
2.	Complete Chapters 1 through 4 up to the section, "Powering Up the System" in the system installation book.	Chapters 1 through 4 in the system installation book for your platform.	
3.	Complete the remainder of Chapter 4 in the system installation book.	Chapter 4, "Powering Up the System" in the system installation book for your platform.	
4.	Complete the appropriate procedures for your switch type in Chapters 5 and 6 of the system installation book up to the section, in Chapter 6 titled, "Administering Channels."	Chapters 5 and 6 in the system installation book for your platform.	
5.	Administer the Lucent INTUITY switch integration windows.	Chapter 4, "Lucent INTUITY Administration for Switch Integration with Digital Station Interface" . Information in Chapter 2, "Planning for Switch Integration with Digital Station Interface" , is also needed.	
6.	Ensure that the switch has been administered to perform acceptance tests for the two test subscribers.	None. Cooperation with the switch administrator is required.	

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Table 1-1. Checklist for Switch Integration with Digital Station Interface

Task	Description	Reference	✓
7.	Return to the “Administering Channels” section in Chapter 6 of the system installation book and complete all required tasks through Chapter 16.	Chapters 6 through 16 in the system installation book for your platform.	
8.	Validate and, if necessary, troubleshoot the integration.	Chapter 5, “Integration Validation and Troubleshooting” .	
9.	Cut to service by notifying the switch administrator or your project manager to change the system subscribers’ call forwarding coverage path to the Lucent INTUITY system.	None.	

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