Cisco Network Location Register User Guide

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CONTENTS

Preface v

Audience v

Organization v

Obtaining Documentation, Obtaining Support, and Security Guidelines vi

CHAPTER 1 **Introduction** 1-1

System Overview 1-1

Network Location Register Description 1-1

Platform Requirements 1-2

Hardware 1-2

Software 1-3

CHAPTER 2 **Interfaces** 2-1

NLR Web Interface Overview 2-1

RNC to NLR Interface 2-1

Network Interface Function (NIF) 2-1

CHAPTER 3 **Configuration** 3-1

Web Interface 3-1

Network Interface Function 3-2

CHAPTER 4 **Operating the NLR** 4-1

Overview 4-1

Logging in to the NLR Web Interface for the First Time 4-2

The NLR Web Interface 4-2

Subscribers Window 4-3

Adding a Single Subscriber 4-4

Adding Multiple Subscribers 4-6

Groups Window 4-7

Adding a Single Group 4-8

Adding an Announcement Group 4-10

Adding a System Group 4-10

Adding Multiple Groups 4-10

Locations Window 4-11
Add a New Location 4-11
Subscriber Home RFSSs Window 4-12
Adding Subscriber Home Ranges 4-12
Group Home RFSSs Window 4-13
Adding Group Home Ranges 4-13
User/Roles Window 4-14
Creating a New System Role 4-15
Editing a System Role 4-15
Deleting a System Role 4-15
System Users 4-16
System Audit Log 4-17
Audit Log Window 4-17
General Tasks 4-18
Sorting Options 4-19
Hiding Columns 4-19
Filtering 4-19
Deleting an Entry 4-20
Modifying an Entry 4-20
Maintenance Operations 4-21
Web Interface Subscriber Inhibit 4-21
Immediate Inhibit Success 4-21
Delayed Inhibit Success 4-22
Unsuccessful Inhibit 4-22
Web Interface Subscriber Uninhibit 4-23
Uninhibit Success 4-23
Unsuccessful Uninhibit 4-23
Persistent Display Settings 4-24
Exporting Data to CSV 4-24
Printing Data 4-24
Help 4-24

CHAPTER 5 **NLR Data Management** 5-1
Manually Creating and Managing the NLR Database 5-1

CHAPTER 6 **Troubleshooting** 6-1
The NLR Web Interface Does not Appear 6-1
NLR Fails to Connect to MySQL Server 6-2

NLR Web Interface Error **6-3**

NLR Redirection / Logout Does not Function Correctly **6-3**

The RNC Cannot Communicate with NLR **6-4**

Inhibit/Uninhibit Does not Function From the Web Interface **6-4**

New Subscriber or Group Additions are not Visible **6-5**

GLOSSARY

INDEX

Preface

This document provides a description of the functionality of the Cisco Network Location Register (NLR), including details of its primary characteristics and how to connect, install, configure, and use this application.

Audience

This document is intended for users and developers who are required to deploy or work with the Cisco Network Location Register. It is assumed that you have a working knowledge of the following:

- Radio technology.
- APCO P25 standards.
- The operating system used by the Network Location Register and associated applications.
- The core network functionality of Cisco.

Organization

This document is organized as follows:

Chapter 1, “Introduction”	Introduces the main functions of this system and provides information about hardware and software platform requirements.
Chapter 2, “Interfaces”	Describes network interfaces and network interface functionality.
Chapter 3, “Configuration”	Provides information about how to configure the NLR and about the NIF configuration which allows communication between the NLR and RNC.
Chapter 4, “Operating the NLR”	Provides information about using the NLR Web Interface and the web interface extended function commands. This chapter also provides information about logging in and creating subscribers, groups and user privileges.

Chapter 5, “NLR Data Management”	Provides information for performing manual operations on the NLR database.
Chapter 6, “Troubleshooting”	Describes some of the most common problems that may need to be resolved to get the NLR operating correctly following a new installation, configuration, or upgrade.

Note This user guide does not cover every application and configuration of the Network Location Register and the troubleshooting section describes only some of the most common problems that may be encountered during the deployment of the system.

Obtaining Documentation, Obtaining Support, and Security Guidelines

For information about obtaining documentation, obtaining support, providing documentation feedback, security guidelines, and recommended aliases and general Cisco documents, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

CHAPTER 1

Introduction

This chapter introduces the Network Location Register (NLR) and provides information about the system hardware and software platform requirements. It contains the following sections:

- System Overview, page 1-1
- Network Location Register Description, page 1-1
- Platform Requirements, page 1-2

System Overview

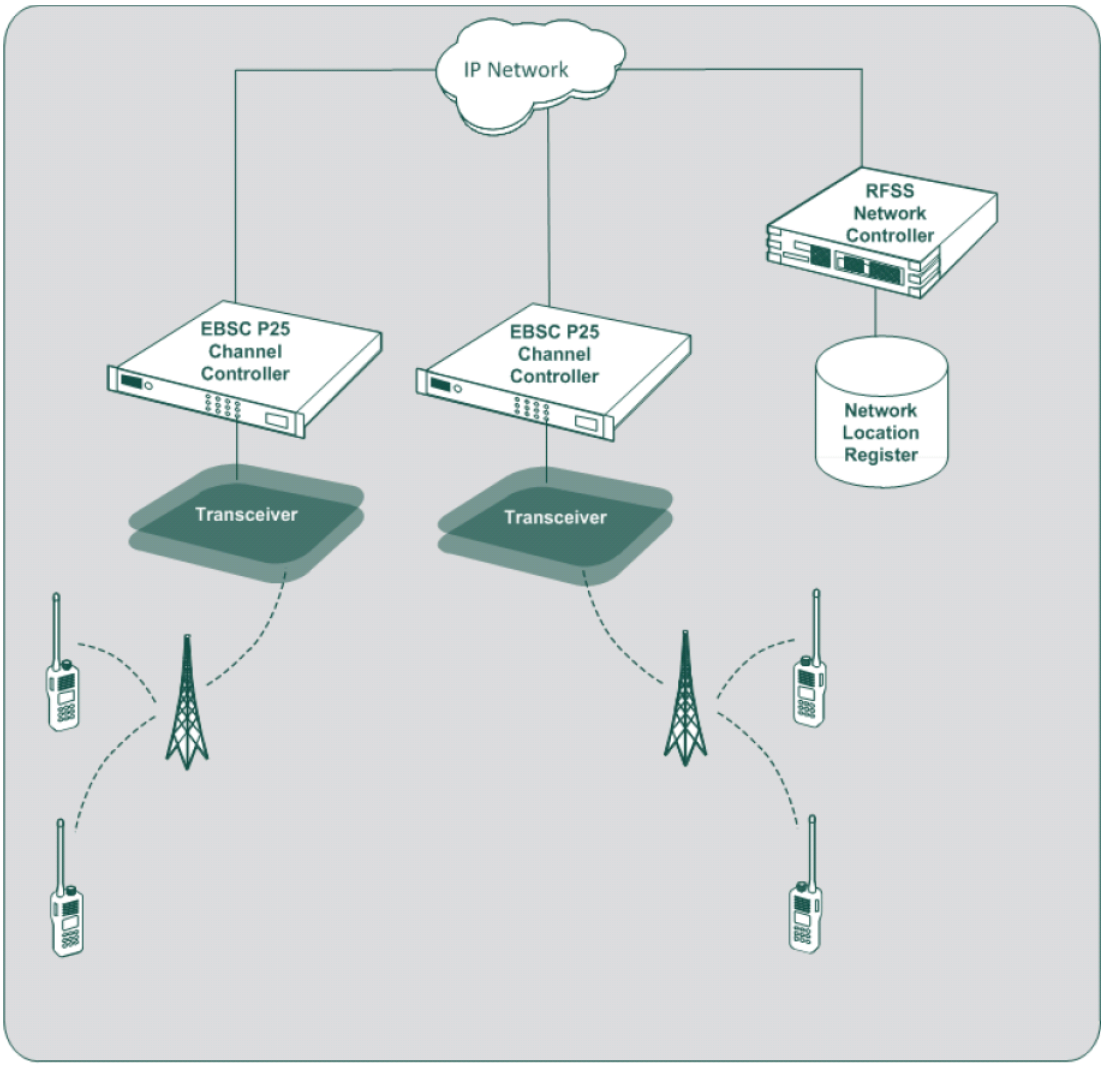
The P25 Network Location Register (NLR) stores data about subscribers and groups operating within a single Radio Frequency Subsystem (RFSS). It can function as a traditional Home Location Register (HLR) for an APCO P25 system as well as a Visitor Location Register (VLR) for roaming subscribers, that is, those subscribers that are not declared ("homed") at this RFSS.

Network Location Register Description

The NLR runs on a Commercial Off-The-Shelf (COTS) PC. All interfaces are IP-based, so no special cables or hardware are required. The NLR can also be part of a high availability or disaster recovery node within the core network.

Figure 1-1 shows an example of a multiple RFSS, consisting of one or more base stations and a central RFSS Network Controller along with the NLR.

Figure 1-1 Typical Multi Site RFSS



Platform Requirements

Hardware

The NLR requires no special equipment to install, as it is a software application that runs on any COTS PC. The NLR will usually plug directly into a local network switch for its network interface. If the NLR is co-hosted with the RNC, it is possible to share a single physical network connection by allocating the primary IP for the RNC and assigning a second virtual IP interface for the NIF process.

Software

The single supported operating system for the NLR is IPICS OS 4.5. Cisco provides an installer that installs the ISSI Gateway software on IPICS OS. The NLR is included on that software installation.

CHAPTER 2

Interfaces

This chapter describes the Network Location Register (NLR) interfaces, and includes the following sections:

- NLR Web Interface Overview, page 2-1
- RNC to NLR Interface, page 2-1
- Network Interface Function (NIF), page 2-1

NLR Web Interface Overview

The Network Location Register (NLR) presents a web interface which enables operators to add, delete, and modify subscriber and group information. This allows easy viewing for local or remote NLR operators to verify and modify NLR details. This interface also provides for the creation of NLR operator roles and users which allows fine-grained control to restrict particular operators from sensitive NLR informations.

RNC to NLR Interface

The RFSS Network Controller (RNC) uses this interface to access information and profiles for subscribers and groups homed at that RFSS. This interface is also used to update and retrieve visiting subscriber information for mobiles that are temporarily roaming within this RFSS. The interface between the RNC and NLR is an IP-based interface which allows physical separation of the RNC and NLR if required.

Network Interface Function (NIF)

The Network Interface Function (NIF) is used to enable communication between the NLR and the RNC.

CHAPTER 3

Configuration

Once the Network Location Register (NLR) package has been successfully installed, it must be configured to make it fully functional. Basic configuration steps include adding subscribers and groups to the RFSS and defining home ranges for those subscribers and groups that are homed at that RFSS. This chapter describes how to configure the Web interface and the Network Interface Function (NIF), and it includes the following topics:

- Web Interface, page 3-1
- Network Interface Function, page 3-2

Web Interface

The Web interface has configuration parameters that should be modified after installation. To configure the Web Interface, perform the following procedure:

Procedure

Step 1 Open the file, located at /home/NlrUser/WebInterface/include/config.inc.php.

Step 2 Modify the entry "THIS_NLR", so that it represents the RFSS that this NLR is part of. The format for this entry is the same as for other /etc/hosts entries, for example:

"*<Rfss_Id>*.*<System_Id>*.*<Wacn_Id>*.**p25dr**"

The identifiers are all hexadecimal numbers which are zero padded and are of the following fixed lengths:

- Rfss_Id: 2 hexadecimal characters (that is, 8 bits).
- System_Id: 3 hexadecimal characters (that is, 12 bits).
- Wacn_Id: 5 hexadecimal characters (that is, 20 bits).

If the NLR is co-hosted on the same machine as the RNC and the hostname of the RNC is of the above format, then the commented entry including "uname -n" may be used to set "THIS_NLR" identity instead.

Network Interface Function

For versions 2.03.000 and later, additional steps must be performed to allow communication between the NLR and RNC. To configure the NIF, perform the following procedure:

Procedure

Step 1 Allocate an IP address to the NIF so that the NIF can communicate with the RNC.

The IP address chosen must not be in use by any other core network process. If the NLR is co- hosted on the same machine as the RNC, then the new IP address can either be added on the same interface or on a separate interface if the host machine has this capability. The use of localhost or 127.0.0.1 for this address is not recommended as these addresses are not externally visible.

Step 2 Assign a valid SUID to the NIF, so that it can communicate with the NLR.

Typically, this will consist of the home WACN and SYSTEM identifiers, along with the last octet of the NIF IP address as the unitId, converted to ISSI (zero-padded hexadecimal) format.

Step 3 Open the config.inc.php file, located at /home/NlrUser/WebInterface/include/config.inc.php and do the following:

- Enter the NIF SUID and IP address values.
- Add a unit subscriber via the NLR web interface matching the NIF_SUID you have specified. For more information about adding a subscriber, see the "Adding a Single Subscriber" section on page 4-4 and the "Adding Multiple Subscribers" section on page 4-6.

Step 4 Open the Nif.config file, located at /home/NlrUser/bin/Nif/Nif.config and do the following:

- Edit the site details in the fields NIF.SiteId, NIF.RfssId, NIF.SystemId and NIF.WacnId to match the details in the /etc/hosts file.
- In the SIP.Local IPAddress field, enter the same IP address used in the config.inc.php file for the NIF_ADDRESS.

Step 5 Edit /etc/hosts on the NIF host machine, adding an entry for the RNC, so that this NIF can communicate with the RNC. For more information, see the Cisco RFSS Network Controller Series User Guide.

If the NLR is co-hosted on the same machine as the RNC, there should already be an entry for the RNC host.

Step 6 Edit /etc/hosts on the RNC host machine, adding an entry for the NIF so the RNC can communicate with this NIF. For more information, see the Cisco RFSS Network Controller Series User Guide.

Step 7 Restart the monit service. To do this, type:

/etc/init.d/monit restart

There should be an entry for the "NifService" running.

CHAPTER 4

Operating the NLR

This chapter describes how to add and manage subscribers and groups using the NLR web interface, and it includes the following topics:

- Overview, page 4-1
- Logging in to the NLR Web Interface for the First Time, page 4-2
- The NLR Web Interface, page 4-2
- Subscribers Window, page 4-3
- Groups Window, page 4-7
- Locations Window, page 4-11
- Subscriber Home RFSSs Window, page 4-12
- Group Home RFSSs Window, page 4-13
- User/Roles Window, page 4-14
- Audit Log Window, page 4-17
- General Tasks, page 4-18
- Help, page 4-24

Overview

The NLR provides the RNC with subscriber and group location information for each RFSS. This information is accessible and editable via the NLR Web Interface. Subscribers and groups must be added to the NLR only at their Home RFSS. Subscribers or groups homed at another RFSS will be automatically added by the local RNC to the NLR when they join the network. Subscriber and group home RFSS ranges must be added at all RFSSs at which the subscriber or group will require service. These ranges provide information on which RFSS needs to be contacted when a unit roams onto another RFSS. If these ranges are not added at a serving RFSS, the serving and home RFSSs will not be able to communicate with each other.

Note For the procedures described in this chapter, it is assumed that the user has Administrator- level privileges within the NLR web interface.

Logging in to the NLR Web Interface for the First Time

To log in to the NLR for the first time, perform the following procedure:

Procedure

Step 1 Open the following URL in a Web browser: **http://**<*ip-address*>**/nlr**.

where <ip-address> is the IP address of the machine on which the NLR is installed.

Step 2 Type **Administrator** in the Username field.

The initial password is blank. This can be changed once you are logged in.

Step 3 Click the **Submit** button.

Step 4 To create a password for the Administrator account, click the **Change password** link on the upper-right of the screen.

Additional roles and users can be created so that the default Administrator account is not used for the majority of NLR operations. Different levels of user access to the NLR can be created and assigned to roles. For more information, see "User/Roles Window" section on page 4-14.

The NLR Web Interface

The NLR is a browser-based application. Upon logging in, a list of subscribers is displayed on the Subscribers' window, which is the "default" window that is seen when the application is launched.

The NLR web interface contains seven main windows, described in Table 4-1. These windows can be accessed by clicking on the corresponding link in the frame at the left of the screen.

Table 4-1 describes the NLR web interface windows.

Table 4-1 NLR Web Interface Windows

Window	Description
Subscribers	Contains data about users who are registered and authorized at a particular RFSS. Also contains data about visiting users who are registered and authorized via communication between the local RFSS and the subscriber's home RFSS. For more information, see the "Subscribers Window" section on page 4-3.
Groups	Contains data about subscriber groups which are active via subscribers being affiliated to those groups. Also contains data about visiting groups which have one or more subscribers affiliated to them and which are authorized to use this RFSS through the group's home RFSS. For more information, see the "Groups Window" section on page 4-7.
Locations	Used to add locations or areas that the RFSS covers. For more information, see the "Locations Window" section on page 4-11.
Subscriber Home RFSSs	Defines the homed RFSSs of users, in which their data is permanently stored. For more information, see the "Subscriber Home RFSSs Window" section on page 4-12.

Table 4-1 NLR Web Interface Windows

Window	Description
Group Home RFSSs	Defines the homed RFSSs of groups, in which their data is permanently stored. For more information, see the "Group Home RFSSs Window" section on page 4-13.
Maintenance Operations	Contains options to reset subscriber and group status.
Users/Roles	Contains information about NLR system users and the functionality they have available to them within a particular RFSS. Note that this function is not available to non-Administrator users. For more information, see the "User/Roles Window" section on page 4-14.
Audit Log	Contains historical data about actions that have occurred via the web interface on this NLR by operators. For more information, see the "Audit Log Window" section on page 4-17.

Subscribers Window

Table 4-2 describes the columns available on the Subscribers window, in alphabetical order.

Table 4-2 Subscriber Window Columns

Column	Description
Alias	Descriptive, textual name for a subscriber.
Expires	The registration period, in seconds, of the subscriber membership at this RFSS.
Inhibited	Indicates whether a subscriber registered at a site has been placed in an "inhibited" mode, where actions other than registration are prohibited.
Last Registration	The last time the subscriber registered (this includes registrations on any other RFSS to which the subscriber has roamed).
Location	The identifier of the site or other RFSS at which the subscriber is currently registered.
Status	The operating state of the subscriber, for example, "registered", "unregistered", "unknown", "waiting for validation", or "blocked".
SUID	Subscriber Unit ID - a 56 bit address in hex format, used to uniquely identify an SU, comprised of the following: • 20 bit WACN ID • 12 bit System ID • 24 bit Unit ID
System ID	The system to which the subscriber belongs. Note that a system may contain more than one RFSS, but a subscriber must only be homed at a single RFSS.
Type	Indicates whether the subscriber represents a single mobile unit or will act as an FNE (Fixed Network Equipment) address.
Unit ID	Mobile radio ID; 24 bit identifier used to represent a mobile radio unit (subscriber).

Table 4-2 Subscriber Window Columns

Column	Description
Visitor	Indicates whether the subscriber is homed at this RFSS or is a visitor.
WACN ID	The WACN (Wide Area Communications Network) to which the subscriber belongs.
WUID	Working Unit ID. For subscribers roaming within an RFSS that is part of their home system, the WUID equals their Unit ID. For subscribers roaming outside their home system, a visitor ID will be assigned from a pool of visitor IDs.

Adding a Single Subscriber

To add a subscriber to the NLR, perform the following procedure:

Procedure

Step 1 Click the **Subscribers** link in the frame on the left of the screen.

Step 2 Click the **Add a New Subscriber** button.

Step 3 Enter the required information. Mandatory fields are marked with an asterisk. All other fields can be modified or left with their default information. See Table 4-3 for more information about the Add a Single Subscriber fields.

Table 4-3 describes the Add a Single Subscriber fields.

Note When adding a single subscriber homed at this RFSS, the mandatory fields are flagged with an asterisk in Table 4-3.

Table 4-3 Add a Single Subscriber Fields

Column	Description
SUID	Subscriber Unit ID - 56 bit address used to uniquely identify an SU comprised of the following: • 20 bit WACN ID • 12 bit System ID • 24 bit Unit ID
Unit ID*	Mobile radio ID; 24 bit identifier used to represent a mobile radio unit (subscriber).
System ID*	Identifier of the system to which the SU belongs.
WACN ID*	Identifier of the WACN to which the subscriber belongs.

Table 4-3 Add a Single Subscriber Fields

Column	Description
WUID*	Working Unit ID. For subscribers roaming within an RFSS that is part of their home system, the WUID is equal to their Unit ID. For subscribers roaming outside their home system, a WUID will be assigned from a pool of visitor IDs. **Note** A WUID cannot be directly entered for a subscriber. It is calculated automatically based on the specified unit ID.
Alias	Descriptive, textual name for a subscriber.
Type*	Whether the subscriber represents a single mobile unit, or will act as a FNE address.
Group Call Perm	Permission for the new subscriber to initiate a group call. The following values are available: • None—No group calls can be initiated. • Non-emergency Only—Only non-emergency group calls can be initiated. • Emergency Only—Only emergency group calls can be initiated. • All—Emergency and non-emergency group calls can be initiated.
Unit Call Perm	Permission for the new subscriber to receive and initiate Unit calls. The following values are available: • None—No Unit calls can be initiated or received. • Receive Only—Only Unit to Unit calls can be received by the new subscriber, that is, the subscriber will not be allowed to initiate Unit calls. • Initiate Only—Only Unit to Unit calls can be initiated by the new subscriber, that is, the subscriber will not be allowed to receive Unit calls. • All—The subscriber can initiate and receive Unit calls.
PSTN Call Perm	Permission for the new subscriber to receive and initiate PSTN or interconnect calls. The following values are available: • None—No PSTN calls can be initiated or received. • Receive Only—Only PSTN to Unit calls can be received, that is, the subscriber will not be allowed to initiate PSTN calls. • Initiate Only—Only Unit to PSTN calls can be initiated, that is, the subscriber will not be allowed to receive PSTN calls. • All—The subscriber can initiate and receive PSTN calls.
System Call Perm	Permission for the new subscriber to initiate a system call. The following values are available: • None—No system calls can be initiated. • All—System calls can be initiated.

Step 4 Click the **Add** button.

Note For conventional operation, each subscriber unit does not have to be added into the database and does not have a Unit ID. For conventional "subscribers", only the site subscriber identities need to be added. This allows sites to affiliate and participate in wide-area conventional group calls.

Adding Multiple Subscribers

To add multiple subscribers to the NLR, perform the following procedure:

Procedure

Step 1 Click the **Subscribers** link in the frame on the left of the screen.

Step 2 Click the **Add Multiple Subscribers** button.

Step 3 Enter the required information. Mandatory fields are marked with an asterisk. All other fields can be modified or left with their default information. See Table 4-4 for more information about the Add Multiple Subscribers fields.

Table 4-4 describes the Add Multiple Subscribers fields.

Note When adding multiple subscribers homed at this RFSS, the mandatory fields are flagged with an asterisk in Table 4-4.

Table 4-4 Add Multiple Subscribers Fields

Column	Description
Start Unit ID*	The first (inclusive) Unit ID of the range to be added.
End Unit ID*	The last (inclusive) Unit ID of the range to be added.
System ID*	Identifier of the system to which the SU belongs.
WACN ID*	Identifier of the WACN to which the SU belongs.
Alias	Descriptive, textual name for a subscriber.
Type	Whether the subscriber represents a single mobile unit, or will act as a FNE address.
Group Call Perm	Permission for the new subscriber to initiate a group call. The following values are available: • None—No group calls can be initiated. • Non-emergency Only—Only non-emergency group calls can be initiated. • Emergency Only—Only emergency group calls can be initiated. • All—Emergency and non-emergency group calls can be initiated.

Table 4-4 Add Multiple Subscribers Fields

Column	Description
Unit Call Perm	Permission for the new subscriber to receive and initiate Unit calls. The following values are available: • None—No Unit calls can be initiated or received. • Receive Only—Only Unit to Unit calls can be received by the new subscriber, that is, the subscriber will not be allowed to initiate Unit calls. • Initiate Only—Only Unit to Unit calls can be initiated by the new subscriber, that is, the subscriber will not be allowed to receive Unit calls. • All—The subscriber can initiate and receive Unit calls.
PSTN Call Perm	Permission for the new subscriber to receive and initiate PSTN or interconnect calls. The following values are available: • None—No PSTN calls can be initiated or received. • Receive Only—Only PSTN to Unit calls can be received, that is, the subscriber will not be allowed to initiate PSTN calls. • Initiate Only—Only Unit to PSTN calls can be initiated, that is, the subscriber will not be allowed to receive PSTN calls. • All—The subscriber can initiate and receive PSTN calls.
System Call Perm	Permission for the new subscriber to initiate a system call. The following values are available: • None—No system calls can be initiated. • All—System calls can be initiated.
Unit ID	Mobile radio ID; 24 bit identifier used to represent a mobile radio unit (subscriber).

Step 4 Click the **Add** button.

Groups Window

Table 4-5 describes the columns available on the Groups window, in alphabetical order.

Table 4-5 Groups Window Columns

Column	Description
Alias	Descriptive, textual name for a subscriber.
Announcement Group ID	The identifier of any parent group of which this new group will be a member. Any announcement PTT will be broadcast to include members of this talk group.
Group ID	Identifier of the new group; a 16 bit identifier used to represent the group.

Table 4-5 Groups Window Columns

Column	Description
RF Hang Time (sec)	The time, in seconds, after the end of a subscriber PTT that a channel remains actively in use for this group.
SGID	SGID: Subscriber Group ID - 48 bit address used to uniquely identify a subscriber group, comprised of the following: • 20 bit WACN ID • 12 bit System ID • 16 bit Group ID
Status	The operating state of the group, for example, "Inactive", "Active", or "Waiting for validation".
System ID	Identifier of the system to which the group belongs.
Type	Indicates whether the group represents a "Standard", "Announcement" or "System" group: • Standard—Regular talk groups that subscribers can affiliate to and communicate on. • Announcement—Parent group consisting of one or more standard groups. When a PTT (Push To Talk) directed towards the Announcement Group is made, all subscribers that are part of a member group will receive the PTT. • System—Group for which all subscribers will receive voice. This can only be set to the Group ID value of 65535 (0XFFFF).
Visitor	Whether the group is homed at this RFSS or is a visitor to this RFSS.
WACN ID	Identifier of the WACN (Wide Area Communications Network) to which the group belongs.
WGID	Where the system and WACN of the group are the same as that of the current RFSS, the Working Group ID is the same as the Group ID, otherwise, it will be selected from the visiting group reserved range. **Note** WGIDs cannot be entered directly, as they are determined based upon the group ID.

Adding a Single Group

To add a single group to the NLR, perform the following procedure:

Procedure

Step 1 Click the **Groups** link in the frame on the left of the screen.

Step 2 Click the **Add a New Group** button.

Step 3 Enter the required information. Mandatory fields are marked with an asterisk. All other fields can be modified or left with their default information. See Table 4-6 for more information about the Add a Single Group fields.

Table 4-6 describes the Add a Single Group fields.

Note When adding a single group homed at this RFSS, the mandatory fields are flagged with an asterisk in Table 4-6.

Table 4-6 Add a Single Group Fields

Column	Description
SGID	SGID: Subscriber Group ID - a 48 bit address used to uniquely identify an SG comprised of the following: • 20 bit WACN ID • 12 bit System ID • 16 bit Group ID
Group ID*	Identifier of the new group; a 16 bit identifier used to represent a multiple group.
System ID*	Identifier of the system to which this group belongs.
WACN ID*	Identifier of the WACN to which this group belongs.
WGID*	Where the system and WACN of the group are the same as that of the current RFSS, the Working Group ID is the same as the Group ID, otherwise, it will be selected from the visiting group reserved range. **Note** WGIDs cannot be entered directly as they are determined based upon the Group ID.
Alias*	Descriptive, textual name for the new group.
Type*	Indicates whether the group represents a "Standard", "Announcement" or "System" group: • Standard—Regular talk groups that subscribers can affiliate to and communicate on. • Announcement—Parent group consisting of one or more standard groups. When a PTT directed towards the Announcement Group is made, all subscribers that are part of a member group will receive the PTT. • System—Group for which all sites will receive voice. This can only be set to the Group ID value of 65535 (0XFFFF).
Announcement Group ID	The identifier of any parent group of which this new group will be a member. Any announcement PTT will include members of this talk group. The available announcement groups which can be selected are created from the database so must exist already.
RF Hang Time (sec)	The time, in seconds, after the end of a subscriber PTT that a channel remains actively in use for this group.
Status	Indicates the operating state of the group, for example, "Inactive", "Active", or "Waiting for validation".

Step 4 Click the **Add** button.

Note For conventional operation, the Group ID does not necessarily correspond to a real Group ID used by APCO 25 air interface. It is a .means of creating a group in the network which acts similarly to an actual trunked group

Adding an Announcement Group

Announcement groups are themselves a grouping of one or more standard groups. To utilize an announcement group to make calls, it must first be added - or an existing group edited - and 'Announcement' selected as the group type. Standard groups can then be linked to this group when they are added or edited by using the 'Announcement Group ID' drop-down box.

Once a standard group is linked to an announcement group, it will be automatically included in a call directed towards that announcement group. To remove the linkage, edit the standard group so that the 'Announcement Group ID' field is 'none', or delete the announcement group itself and all child groups will automatically be unlinked.

Adding a System Group

A system group is a special group identifier which is reserved for use to communicate to all subscribers on a system. To add a system group call, choose **System** on the group "Type" drop-down box. The group identifier must be 0xFFFF (65535) as this is a reserved value used on the air interface by subscriber units without an explicit affiliation to that group.

Once created within the NLR, radio subscriber units or other network subscribers may initiate system group calls with or without prior group affiliation. This permission to initiate a system group call can be restricted to prevent particular subscribers from this functionality.

Adding Multiple Groups

To add multiple groups to the NLR, perform the following procedure:

Procedure

Step 1 Click the **Groups** link in the frame on the left of the screen.

Step 2 Click the **Add Multiple Groups** button.

Step 3 Enter the required information. Mandatory fields are marked with an asterisk. All other fields can be modified or left with their default information. See Table 4-7 for more information about the Add Multiple Groups fields.

Table 4-7 describes the Add Multiple Groups fields.

Note When adding multiple groups homed at this RFSS, the mandatory fields are flagged with an asterisk in Table 4-7.

Table 4-7 Add Multiple Groups Fields

Column	Description
Start Group ID*	The first (inclusive) Group ID of the range to be added.
End Group ID*	The last (inclusive) Group ID of the range to be added.
System ID*	Identifier of the system to which this group belongs.
WACN ID*	Identifier of the WACN to which this group belongs.
Alias	Textual name used to refer to the groups.
Type*	Indicates whether the group represents a "Standard", "Announcement" or "System" group: • Standard—Regular talk groups that subscribers can affiliate to and communicate on. • Announcement—Parent group consisting of one or more standard groups. When a PTT directed towards the Announcement Group is made, all subscribers that are part of a member group will receive the PTT. • System—Group for which all sites will receive voice. This can only be set to the Group ID value of 65535 (0XFFFF).
Announcement Group ID	The identifier of any parent group of which these new groups will be a member. Any announcement PTT will include members of these talk groups. The available announcement groups which can be selected are created from the database so must exist already.
RF Hang Time (sec)	The time, in seconds, after the end of a subscriber PTT that a channel remains actively in use for these groups.

Step 4 Click the **Add** button.

Locations Window

This window is used to add locations or areas that the RFSS covers.

Table 4-8 describes the columns available on the Locations window, in alphabetical order.

Table 4-8 Locations Window Columns

Column	Description
Location ID	A numerical value used to define the location.
Location Alias	A textual description of the location.

Add a New Location

To add a new location to the NLR, perform the following procedure:

Procedure

Step 1 Click the **Locations** link in the frame on the left of the screen.

Step 2 Click the **Add New Location** button.

Step 3 Enter the required information. Mandatory fields are marked with an asterisk. See Table 4-9 for more information about the Add Multiple Groups fields.

Table 4-7 describes the Add New Location fields.

Table 4-9 Add New Location Fields

Column	Description
Location ID	Add a location identification number.
Location Alias	Add a textual description of the location.

Step 4 Click the **Add** button.

Subscriber Home RFSSs Window

This window is used to create links between ranges of subscribers and the RFSS to which they are homed.

Table 4-10 describes the columns available on the Subscriber Home RFSSs window, in alphabetical order.

Table 4-10 Subscriber Home RFSSs Window Columns

Column	Description
Alias	A textual description of the RFSS in which the range of Unit IDs is homed.
RFSS ID	RFSS ID of the home RFSS for all units within the range.
System ID	System ID of the home RFSS for all units within the range.
Unit ID Max	The maximum (inclusive) Unit ID in the range.
Unit ID Min	The minimum (inclusive) Unit ID in the range.
WACN ID	WACN ID of the home RFSS for all units within the range.

Adding Subscriber Home Ranges

To associate a range of Unit IDs with a home RFSS, perform the following procedure:

Procedure

Step 1 Click the **Subscriber Home RFSSs** link in the frame on the left of the screen.

Step 2 Click the **Add New Subscriber Range to Home RFSS Mapping** button.

Step 3 Enter the required information. Mandatory fields are marked with an asterisk. See Table 4-11 for more information about the Add New Subscriber Range to Home RFSS Mapping fields.

Table 4-11 describes the Add New Subscriber Range to Home RFSS Mapping fields.

Table 4-11 Add New Subscriber Range to Home RFSS Mapping Fields

Column	Description
System ID	System ID of the home RFSS for all units within the range.
WACN ID	WACN ID of the home RFSS for all units within the range.
RFSS ID	RFSS ID of the home RFSS for all units within the range.
Unit ID Min	The minimum (inclusive) Unit ID in the range.
Unit ID Max	The maximum (inclusive) Unit ID in the range.
Alias	A textual description of the RFSS in which the range of Unit IDs is homed.

Step 4 Click the **Add** button.

Group Home RFSSs Window

This window is used to create links between groups and the RFSS to which they are homed.

Table 4-12 describes the columns available on the Group Home RFSSs window, in alphabetical order.

Table 4-12 Group Home RFSSs Window Columns

Column	Description
Alias	A textual description of the RFSS in which the groups are homed.
Group ID Max	The maximum (inclusive) Group ID in the range.
Group ID Min	The minimum (inclusive) Group ID in the range.
RFSS ID	RFSS ID of the home RFSS for all groups within the range.
System ID	System ID of the home RFSS for all groups within the range.
WACN ID	WACN ID of the home RFSS for all groups within the range.

Adding Group Home Ranges

To associate a Group ID Range with its home RFSS, perform the following procedure:

Procedure

Step 1 Click the **Group Home RFSSs** link in the frame on the left of the screen.

Step 2 Click the **Add New Group Range to Home RFSS Mapping** button.

Step 3 Enter the required information. Mandatory fields are marked with an asterisk. See Table 4-13 for more information about the Add New Group Range to Home RFSS Mapping fields.

Table 4-11 describes the Add New Group Range to Home RFSS Mapping fields.

Table 4-13 Add New Group Range to Home RFSS Mapping Fields

Column	Description
System ID	System ID of the home RFSS for all groups within the range.
WACN ID	WACN ID of the home RFSS for all groups within the range.
RFSS ID	RFSS ID of the home RFSS for all groups within the range.
Group ID Min	The minimum (inclusive) Group ID in the range.
Group ID Max	The maximum (exclusive) Group ID in the range.
Alias	A textual description of the RFSS in which the groups are homed.

Step 4 Click the **Add** button.

User/Roles Window

Individual users of the NLR will require access to specific functionality according to the operations that they are required (and permitted) to perform. System roles are used to define the access and operational permissions for one or more users. Each user is categorised as belonging to a particular role, inheriting the permissions associated with that role. This hierarchy enables management of large numbers of users based on changes to the role to which they belong.

The initial roles are "Operator" and "Administrator", but unlimited numbers of roles may be added and the permissions customised for each.

Caution Do not delete the "Administrator" role. This is the only system role that has the system privileges to fully administrate subscriber content in the NLR.

To display the Users/Roles window, click on the **Users/Roles** link in the left-hand frame. This window consists of three sections, allowing for the following functions:

- Management of system roles, including addition, editing and deletion.
- Assignment or changing of the system roles for each NLR user.
- Reporting of recent actions (the 'System Audit Log') that have been performed from this window.

Table 4-14 describes the columns available on the Users/Roles window.

Table 4-14 Users/Roles Window Columns

Column	Description
Name	Descriptive, textual name for an assigned role or system user.
Default	The default role that a new user is assigned when they are added to the NLR.
Role	Identifies the level of access assigned to system users.

Creating a New System Role

To create a new system role, perform the following procedure:

Procedure

Step 1 Click the **Users/Roles** link in the frame on the left of the screen.

Step 2 In the Add New System Role area, enter a name for the new role in the Name field.

Step 3 Click the **Add** button.

The new system role is created with the full rights that the role allows. Note that non- administrative roles will be restricted by default. After it has been added a role may be edited to adjust the access rights. For more information, see the "Editing a System Role" section on page 4-15.

Editing a System Role

To edit a system role, perform the following procedure:

Procedure

Step 1 Click the **Users/Roles** link in the frame on the left of the screen.

Step 2 In the System Roles area, click the **Edit** button associated with the role that needs to be changed.

The Edit Role window is displayed.

Step 3 Do any of the following:

- To change the name of the role, enter a new name in the Name field and click the **Save** button.
- To change the permissions available to that role, check or uncheck the relevant checkboxes in the Set Premissions for Role area and click the **Save Permissions** button.

Deleting a System Role

System roles can be edited, or deleted from the system if no users are classified as belonging to that role. To edit or delete a system role, perform the following procedure:

Procedure

Step 1 Click the **Users/Roles** link in the frame on the left of the screen.

Step 2 In the System Roles area, click the **Delete** button associated with the role that needs to be deleted.

Caution All users who belong to that role will also be deleted.

System Users

Access to the NLR is controlled by a user login system. The "System Users" feature allows users to be added to the system, deleted from the system, and assigned to system roles. These tasks are initiated from within the System Users section of Users/Roles.

This section includes the following topics:

- Adding a User, page 4-16
- Editing a User, page 4-16
- Deleting a User, page 4-17

Adding a User

To add a new user, perform the following procedure:

Procedure

Step 1 Click the **Users/Roles** link in the frame on the left of the screen.

Step 2 In the Add New System User area, add the following details for the new user:

- Enter the username in the Name field.
- Choose the user role from the **Role** drop-down list.
- Enter the user password in the Set Password field and re-enter it to confirm.

Step 3 Click the **Add** button.

Editing a User

To edit a user, perform the following procedure:

Procedure

Step 1 Click the **Users/Roles** link in the frame on the left of the screen.

Step 2 In the System Users area, click the **Edit** button associated with a user.

The Edit User dialog box is displayed.

Step 3 Modify any of the following details:

- User role.
- Current password.

Note Access rights cannot be modified for users on an individual basis. User rights may be modified by changing the rights that apply to the user role, or by changing the assigned role for the user.

Step 4 Click the **Save** button.

Deleting a User

To delete a user, perform the following procedure:

Procedure

Step 1 Click the **Users/Roles** link in the frame on the left of the screen.

Step 2 In the System Users area, click the **Delete** button associated with a user.

System Audit Log

The System Audit Log is used to track user login and logout times, as well as all activities by NLR web interface users that have resulted in administrative changes to the NLR, for example changes to the users and roles that are used to access the NLR web interface itself.

Table 4-15 describes the columns available on the system audit log.

Table 4-15 System Audit Log Columns

Column	Description
IP	Indicates the IP address of the NLR user who performed the action.
Logged-in User	Indicates the identity of the NLR user who performed the action.
Message	A comment describing the activity and parameters that have changed.
Target User	The identity of the user upon which an action was performed by the logged-in user.
Target Role	The role of the target user after the action was completed.
Timestamp	The time an operation was performed.
Type	The type of operation performed.

Audit Log Window

The Audit Log is used to track all activities by NLR web interface users that have resulted in changes to operational aspects of the NLR database, for example changes to subscribers, groups or home RFSS range maps.

Table 4-16 describes the columns available on the Audit Log window, in alphabetical order.

Table 4-16 Audit Log Window Columns

Column	Description
Group Home ID String	A record of the group home range that has been added, removed or modified when using the Group Home RFSS window **Note** The Group Home ID String is a concatenation of the System ID, WACN ID, Unit ID Min and Unit ID Max.
IP Address	The NLR user's IP address
Logged in User	The identity of the NLR user who has performed the action.
Message	A comment describing the activity and parameters that have changed.
SGID	A record of the group that has been added, removed or modified when using the Groups window.
Subscriber Home ID Window	A record of the home range of the subscriber that has been added, removed or modified when using the Subscriber Home RFSS window. **Note** The Subscriber Home ID String is a concatenation of the System ID, WACN ID, Unit ID Min and Unit ID Max.
SUID	A record of the subscribers that have been added, removed or modified when using the Subscribers window.
Timestamp	The time an NLR operation was performed.
Type	The type of NLR operation that was performed.

General Tasks

This section describes general tasks that can be performed on windows within the NLR web interface, and it contains the following topics:

- Sorting Options, page 4-19
- Hiding Columns, page 4-19
- Filtering, page 4-19
- Deleting an Entry, page 4-20
- Modifying an Entry, page 4-20
- Maintenance Operations, page 4-21
- Web Interface Subscriber Inhibit, page 4-21
- Immediate Inhibit Success, page 4-21
- Delayed Inhibit Success, page 4-22
- Unsuccessful Inhibit, page 4-22
- Web Interface Subscriber Uninhibit, page 4-23
- Uninhibit Success, page 4-23

- Unsuccessful Uninhibit, page 4-23
- Persistent Display Settings, page 4-24
- Exporting Data to CSV, page 4-24
- Printing Data, page 4-24

Sorting Options

The columns on most of the windows available from the NLR web interface have the capability to display sorted data. Entries displayed in tables within the NLR web interface may be sorted according to the columns in the table.

Note The Maintenance Options window has no sorting options.

The (up) and (down) buttons below each column heading in a table can be used to sort all rows as ordered by the values in that column.

Entries can be sorted in several ways. The simplest way is to sort entries in a single column. For example, on the Subscribers window, if the Alias column is used to sort entries, then all the entries in that column will be displayed in either ascending or descending alphabetical order.

Following a sorting action, if no other columns have been sorted since navigating to that window, the entries in all the other columns will be displayed in no particular order. Advanced sorting is possible, allowing ordering based on two columns. For example, if it is desirable to view entries sorted firstly in order of their WACN ID, and then by their corresponding unit IDs, then the Unit ID column should be sorted first, and then the WACN ID column should be sorted. This will result in the table displaying units ordered by their WACN, with units of the same WACN ordered by their unit ID.

Hiding Columns

Within most tables in the NLR, columns that do not include useful data may be temporarily 'hidden'. For example, on the Groups window, to prevent the Group ID column from being displayed, click the (minus) button below the column heading.

The minus button is then replaced by a (plus) button. Click this button to restore the column.

Filtering

Filtering is possible based on the field directly above the column contents in a table. For example, on the Subscribers window, the subscriber entries displayed on the window can be filtered based on their "Status" and/or "Type".

For fields with low numbers of possible content options, such as the Status column on the subscriber table, a drop-down box will list all the possible values of the column, allowing filtering on any one of these items.

For fields with a large number of content options, a free text field is used to filter the displayed column data. For example, in the Alias column on the Subscriber window, if the text "SoftRadio" is typed into the filter text field, then only entries which contain that text anywhere in their Alias field will be displayed.

To filter table contents on the Subscribers window, for example, perform the following procedure:

Procedure

Step 1 To filter by the status of a subscriber unit, in the Status drop-down list, choose the filter criteria from the drop-down list at the top of the column (beneath the up, down and minus/plus buttons).

Step 2 Press the **Enter** key to apply the filter.

Only items that correspond to the value selected for the filter will be displayed. Additional filters can be added to other columns to further restrict the display of items.

Step 3 To remove filters, do either of the following:

- To remove a single filter, click the (red X) button to the right of the selected filter.
- To remove all filters, click the (filter removal) button on the upper-right corner of the screen.

Deleting an Entry

Entries on most operational windows can be deleted from the database. For example, to delete a subscriber on the Subscribers window, perform the following procedure:

Procedure

Step 1 Click the **Subscribers** link in the frame on the left of the screen.

Step 2 Click the **Delete** button associated with a subscriber.

A confirmation box is displayed to confirm all deletions.

Step 3 Click **OK** to remove the entry from the database.

Modifying an Entry

To modify a table entry, perform the following procedure:

Procedure

Step 1 Click the appropriate link in the frame at the left of the screen to open a window.

Step 2 Click the **Edit** button associated with the row for the entry.

A window will be displayed, allowing the fields associated with the entry to be edited.

Step 3 Once the modifications are made, click **Save**.

If the Save button is not clicked before navigating away from this window, then all changes made to this entry will be lost.

Clicking the **Reset** button will reload the values stored in the database for that entry. Note that this will result in unsaved changes made to the form being lost.

Step 4 To return to the previous window, click the **Return to List** button.

Maintenance Operations

To carry out maintenance operations, perform the following procedure:

Procedure

Step 1 Click the **Maintenance Operations** link in the frame on the left of the screen.

Step 2 Choose from the following maintenance operations:

- To reset the status of all subscribers to "Unregistered", click the **Reset All Subscribers** button.
- To reset the status of all groups to "Inactive", click the **Reset All Groups** button.

Caution Either of these selections may significantly impact subscriber data in the NLR.

Web Interface Subscriber Inhibit

Note From release R02.03.000 and later, the inhibit state of registered subscriber units can be changed directly from the web interface.

To inhibit a registered subscriber unit, perform the following procedure:

Procedure

Step 1 Click the **Subscribers** link in the frame on the left of the screen.

Step 2 Click the **Inhibit** button associated with the subscriber to be inhibited.

A confirmation box is displayed to confirm the action.

Step 3 Click **OK**.

The NLR will use the NIF to initiate the inhibit with the RNC. The inhibit command may take a number of seconds to report success or failure.

Immediate Inhibit Success

After performing an inhibit command on a registered subscriber unit, upon receipt of a valid response, a success message will be displayed to indicate that the unit has been inhibited. The inhibit button will automatically change to display "Uninhibit". For more information about inhibiting a subscriber, see the "Web Interface Subscriber Inhibit" section on page 4-21.

Delayed Inhibit Success

If the subscriber unit is registered but cannot be contacted, an inhibit command will be stored and applied the next time the unit registers, or attempts an action on the system (PTT, Supplementary Service, etc). The state of the unit in the NLR will be the same for this case as for an immediate success.

Figure 4-1 shows an example of a delayed inhibit success.

Figure 4-1 Delayed Inhibit Success

Unsuccessful Inhibit

If the NIF cannot be contacted, or the subscriber unit is currently unregistered, the inhibit process will fail. An error message will be displayed, the state of the unit in the NLR will remain as 'uninhibited', and the inhibit button will remain unchanged.

Figure 4-2 shows an example of a failed inhibit operation.

Figure 4-2 Failed Inhibit Operation

Web Interface Subscriber Uninhibit

Once inhibited, a unit may be uninhibited from the web interface using a similar procedure as to that of inhibit. The possible outcomes of the uninhibit operation differ from those of an inhibit operation. For more information, see the "Uninhibit Success" section on page 4-23 and the "Unsuccessful Uninhibit" section on page 4-23.

To uninhibit a registered subscriber unit, perform the following procedure:

Procedure

Step 1 Click the **Subscribers** link in the frame on the left of the screen.

Step 2 Click the **Uninhibit** button associated with the subscriber to be uninhibited.

A confirmation box is displayed to confirm the action.

Step 3 Click **OK**.

Uninhibit Success

A successful uninhibit mirrors the corresponding inhibit operation, restoring the state of the unit to 'uninhibited' and reverting the action button text to "Inhibit".

Figure 4-3 shows an example of a successful uninhibit operation.

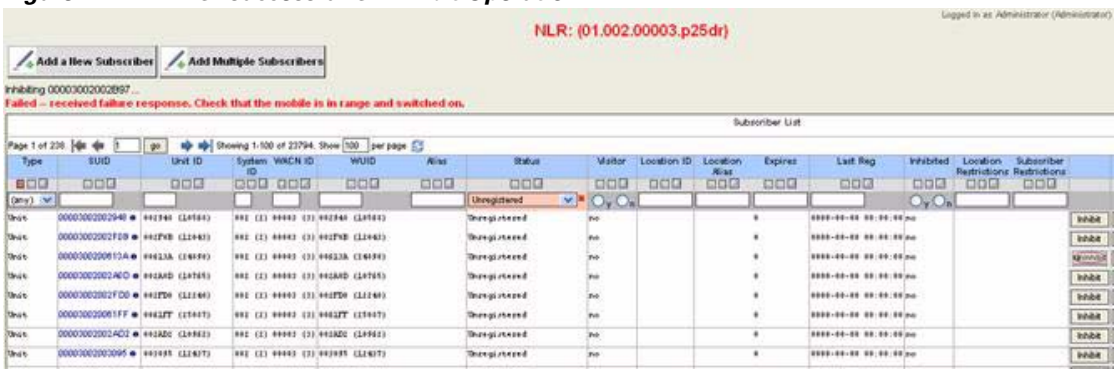
Figure 4-3 Successful Uninhibit Operation

Unsuccessful Uninhibit

The uninhibit process differs from the inhibit process in the event that the mobile is registered but cannot be contacted. If a success response is not received from the mobile for any reason, the uninhibit action is considered to have failed. In this case, the NLR will continue to show the unit as inhibited, as well as displaying the "Uninhibit" button.

Figure 4-4 shows an example of an unsuccessful uninhibit operation.

Figure 4-4 Unsuccessful Uninhibit Operation



Persistent Display Settings

Sorting, column suppression and filtering settings are stored as part of the NLR session management.

If you wish to reset all these settings in the NLR, delete the PHPSESSID browser cookie stored under the IP address of the NLR.

Exporting Data to CSV

To export data to comma separated value (CSV) format, for example, for importing into Microsoft Excel, click (the spreadsheet icon) at the top of the screen.

Printing Data

To print the displayed data, click (the printer icon) at the top of the screen. A printer-friendly format that excludes the left panel will be generated.

Help

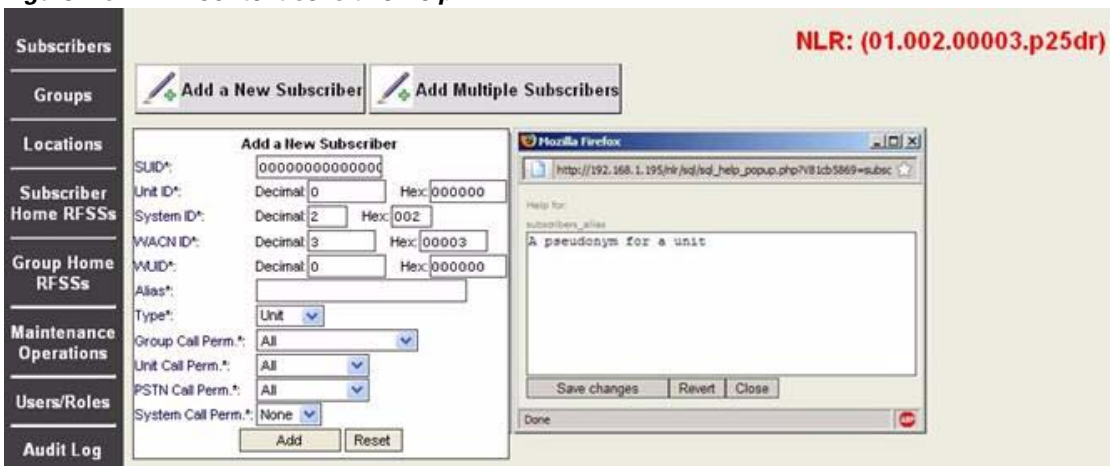
System help is available by clicking the Help button located on the upper-right of the screen. Context-sensitive help is also available by clicking any text field that is coloured blue.

Initially, all help descriptions are blank, but can be modified by users with Administrator privileges. Once saved, all users will see the description the next time they click on that field.

When accessed via Microsoft Internet Explorer, context sensitive help is also accessible by pressing the **F1** key. The help description will display the context help based on the current cursor location.

Figure 4-5 shows the addition of example help text for the Alias field, as accessed via the Subscribers window.

Figure 4-5 Context-sensitive Help



CHAPTER 5

NLR Data Management

This chapter describes how to create and manage the database that is used by the NLR manually, and includes the following section:

- Manually Creating and Managing the NLR Database, page 5-1

Manually Creating and Managing the NLR Database

During normal installation, a script is used to automatically create the database used by the NLR. If the NLR is freshly installed with a default MySQL installation, no manual intervention is required. However, if the root user or password for MySQL has been changed from the default values, or if the NLR database needs to be reinstalled, the NLR database script Nlr_mysql.sh may need to be run manually.

The Nlr_mysql.sh script is used to create, remove, backup or restore the entire NLR database. This script requires MySql root access to set up the database and create the user credentials used by the RNC and NLR. The Nlr_mysql.sh script is located at /home/NlrUser/scripts.

On a new MySQL installation the root user is 'root' with no password. If only the password has been changed, a prompt will appear during NLR installation to request the MySql root user password, and there should be no need to run the script Nlr_mysql.sh script. For automated installs, where user input is not possible, or if a user other than 'root' is to be used, the file will have to be modified.

To modify the script Nlr_mysql.sh, perform the following procedure:

Warning **Care must be taken with the following steps as certain options have the capability to remove all existing database information. Also, be aware that when the drop command is used, all data will be lost.**

Procedure

Step 1 Open Nlr_mysql.sh in a text editor.

Step 2 Under "user setup" change the values specified for "ROOT_USER" and "DEFAULT_PW" to the correct MySql root login details.

This action creates the basic table structure used by the NLR.

Step 3 Enter any of the following arguments, where:

- **create** creates the database and users required to access the database.

- **drop** removes the database and users (all subscriber data will be lost).
- **reinit** executes a “drop” command, then a “create” command (all subscriber data will be lost).
- **backup** prints all database values to the Linux standard output.
- **restore** <*filename*> restores database from a file.

MySql users "NlrUser" and "RncUser" are created to access the NLR data. A standard installation should not need to modify this.

Note Advanced Users Only: The user names and hashed passwords are stored in the "DEFAULT_SQL_USERS" array in Nlr_mysql.sh. Changing these values will also necessitate changes to config.inc.php and the RNC configuration file.

Step 4 For manual database and user setup, run the script Nlr_mysql.sh with the "create" argument as follows:

/bin/sh /home/NlrUser/bin/Nlr_mysql.sh create

CHAPTER 6

Troubleshooting

This chapter contains a number of basic troubleshooting scenarios, including some of the most common problems that need to be resolved to get the NLR operating correctly following a new installation, configuration, or upgrade. This section does not cover all possible issues.

This chapter includes the following sections:

- The NLR Web Interface Does not Appear, page 6-1
- NLR Fails to Connect to MySQL Server, page 6-2
- NLR Web Interface Error, page 6-3
- NLR Redirection / Logout Does not Function Correctly, page 6-3
- The RNC Cannot Communicate with NLR, page 6-4
- Inhibit/Uninhibit Does not Function From the Web Interface, page 6-4
- New Subscriber or Group Additions are not Visible, page 6-5

The NLR Web Interface Does not Appear

Problem

The NLR Web interface does not appear.

Solution

Perform the following steps:

Step 1 Access the NLR. On the host computer the NLR can be accessed at: **http://localhost/nlr**, or remotely at **http://**<*ip-address*>**/nlr**

where <ip-address> is the IP address of the NLR Machine.

Step 2 Check the Apache web server setup to ensure that the web server is running and configured correctly. To do this, perform the following steps:

- Open a web browser and navigate to **http://localhost** or **http://**<*ip-address*> for remote access

  where <ip-address> is the IP address of the NLR Machine.
- If a window is displayed with a message stating that the Apache installation on this system was successful, go to step 3 and check the web directory permissions.
- If a message window is not displayed, open the command prompt and then type:

su -

- Run the following command, looking for the 'httpd' entry:

  monit summary

- If the httpd process does not report a 'running' status, then start httpd using the following command:

  monit start httpd

- Verify that the process is running by navigating to the web interface or by running the following command again:

  monit summary

Step 3 Ensure http://localhost/nlr is pointing to the WebInterface directory. To do this, perform the following steps:

- Open the file **/etc/httpd/conf.d/Nlr.conf** and ensure there are entries for the following:

  Alias /NLR /home/NlrUser/WebInterface

  Alias /Nlr /home/NlrUser/WebInterface

  Alias /nlr /home/NlrUser/WebInterface.

Note If the web interface directory has been changed from the default, substitute the new directory in the commands in this section.

- Check that the web directory permissions are set to 'read' and 'execute' for all system users. To do this, type the following:

  ls -al /home/NlrUser/WebInterface

  If the reported permissions are wrong, type:

  chmod -R 775 /home/NlrUser/WebInterface>

NLR Fails to Connect to MySQL Server

Problem

The NLR displays the error:

“Could not connect to mysql server.”

This typically means that there is a problem with the MySQL setup.

Solution

The following steps can be taken to troubleshoot the MySQL installation.

Step 1 Check the installation of the required software packages, particularly "mysql" and "php-mysql". To check if a package has been installed, enter the following command:

yum list <*package name*>

Step 2 Ensure that the "MySQL daemon" is started. To do this, type:

/etc/init.d/mysqld status or **monit summary**

Step 3 At the command line, start MySQL (as super user). To do this, type:

monit start mysqld

The "MySQL" process should now be running. The NLR database can be removed and reinstalled using the provided script. For more information, see the "NLR Data Management" section on page 5-1.

Step 4 Check that the file /home/NlrUser/WebInterface/Include/config.inc.php is configured with the following MySQL access parameters:

- User ($db_user) should be 'root'.
- Password ($db_pass) should be 'ipics45'.
- Database ($db_name) should be 'nlr'.

NLR Web Interface Error

Problem

The NLR web interface appears blank and user action prompts the following error:

"SQL query failed: You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near 'if(instr(subscribers' at line 1 (query: show columns from if(instr(subscribers)."

In this case, the process that automatically retrieves the hostname has failed.

Solution

The line specifying "uname" should be commented in the file /home/NlrUser/bin/config.inc.php and the value hard-coded, as follows:

define("THIS_NLR", "01.002.00003.p25dr");

//define("THIS_NLR", exec("uname -n"));

NLR Redirection / Logout Does not Function Correctly

Problem

The NLR redirection / logout does not function correctly. This may be caused by changes between releases to the cookies stored in the web browser of the user, meaning that the logout process is not possible after installation, or that it redirects to a non-existent web page.

Solution

Try clearing all cookies for the IP address used to access the web interface, reloading the page, and executing the action again.

The RNC Cannot Communicate with NLR

Problem

The RNC cannot communicate with NLR. This may be because the RNC is unable to recognize the NLR. This is indicated by the following:

- SNMP Trap is being sent by the RNC to the NMS.
- One or more log entries in the RNC log indicating NLR connection failure.

Solution

The most likely cause of this error is the RNC configuration. This configuration must be referred to when setting up the RNC. At a minimum, the RNC must be provided with the location of the NLR and the user and password details for the NLR database.

Inhibit/Uninhibit Does not Function From the Web Interface

Problem

Inhibit/uninhibit does not function from the web .nterface. This may be because the NLR web interface is unable to contact the NIF which indicates the inhibit on behalf of the NLR.

Solution

Perform the following steps:

Step 1 Check that the NifService is reported as "running". To do this, use the following command:

monit summary

If there is a problem with execution, check Nif.log in the /home/NlrUser/bin/Nif directory to help determine the problem.

Step 2 Check that /home/NlrUser/bin/Nif/Nif.config is configured correctly with a unique IP address that matches NIF_ADDRESS in: /home/NlrUser/WebInterface/include/config.inc.php

Step 3 Check that the NIF SUID specified in /home/NlrUser/WebInterface/include/config.inc.php matches a unit subscriber created in the NLR.

Step 4 Check that the file /etc/hosts has correct, separate entries for the NIF and for the RNC. For example:

NIF

192.168.1.13000082.01.002.00003.p25dr

RNC

192.168.1.195 01.002.00003.p25dr

Step 5 If steps 1 through 4 do not resolve the problem, try commenting out the line that specifies automatic retrieval from NIF_CONFIG which will force the use of the configured NIF_ADDRESS and NIF_SUID.

Step 6 Check that the hosts file on the RNC machine has matching entries to the local hosts file.

New Subscriber or Group Additions are not Visible

Problem

New subscriber or group additions are not visible. In Internet Explorer, some pages are cached so the addition of a new subscriber or group may not be seen after it is added, even though the subscriber or group exists in the database. This is typically more noticeable with Internet Explorer Version 6 but has also been evident in Version 7.

Solution

Reload the web page by pressing the **Ctrl** and **F5** keys simultaneously.

GLOSSARY

A

ABNF Augmented Backus-Naur Form; used to describe syntax of fields in the ISSI standards.

Alias Descriptive name for a subscriber, group or RFSS.

APCO Association of Public-Safety Communications Officials.

APCO Project 25 Digital conventional and trunked radio standard. Note that in this document, "APCO" as used invariably refers to APCO Project 25. See APCO P25, the radio protocol defined by the Group.

C

COTS Commercial Off The Shelf.

F

FNE Fixed Network Equipment.

G

GID Group ID - 16 bit address which makes up part of an SGID.

H

HLR Home Location Register.

Homed A mobile unit that has its subscriber details defined in the NLR of a particular RFSS. This mobile unit may roam to other RFSSs, in which case it will be registered as a "visitor" unit once that RFSS confirms registration information with the home RFSS of the unit.

I

Inhibited Indicates whether a subscriber registered at a site has been placed in an "inhibited" mode, where actions other than registration or affiliation to the null group are prohibited.

IMBE Improved Multi-Band Excitation.

IP Internet Protocol.

ISSI Inter-RF Sub System Interface; protocol used to communicate between RF Subsystems.

L

Last Registration Indicates the last time the subscriber registered with this site.

Location Indicates the identifier of the site at which the subscriber is currently registered.

LRA Location Registration Area, typically this area is equivalent to an RFSS for APCO P25.

N

NIF Network Interface Function.

NLR Network Location Register.

NMS Network Management System.

P

P25 See APCO 25.

PSTN Public Switched Telephone Network.

PTT Push To Talk.

R

RF Radio Frequency.

RPM Red Hat Package Manager; this is both a software package file format, as well as a software package coded in that format. For the purposes of this guide, RPM is an extension package/executable used to install/uninstall software associated with the NLR.

RFSS Radio Frequency Subsystem.

RNC RFSS Network Controller.

S

SG Subscriber Group.

SGID Subscriber Group ID; 48 bit address used to uniquely identify an SG comprised of a 20 bit WACN ID, a 12 bit System ID, and a 16 bit Group ID.

SIP Session Initiation Protocol (see RFC 3261).

SNMP Simple Network Management Protocol (see RFC 2578).

Status Indicates the operating state of a subscriber or group.

SU Subscriber Unit; used as an equivalent term to mobile radio (MR), mobile station (MS), terminal, portable or radio.

Subscriber A mobile unit that is a "member" of an RFSS and recognized as being homed at a particular RFSS.

SUID Subscriber Unit ID; 56 bit address used to uniquely identify an SU comprised of a 20 bit WACN ID, a 12 bit System ID, and a 24 bit Unit ID.

T

TGID Talk Group ID; subscribers assigned to a particular group containing characteristics that are similar to all the subscribers in that group.

TIA Telecommunications Industry Association.

Trunked Operation A mode of operation where mobile radios communicate with each other via a trunking system with centralized control and arbitration of channel access, allocation and operation.

U

UDP User Datagram Protocol (RFC 768).

Unit ID Mobile radio ID; 24 bit identifier used to represent a mobile radio unit (subscriber).

V

Visitor Indicates whether the subscriber or group is homed at its current RFSS or is a visitor to this RFSS.

W

WACN Wide Area Communications Network.

WGID Working Group ID. Where the Working Group identifier for a group homed at the same system as this RFSS, the Working Group ID is the same as the Group ID; otherwise it will be selected from the visiting group reserved range.

WUID Working Unit ID. For subscribers roaming within an RFSS that is part of their home system, the WUID equals their Unit ID. For subscribers roaming outside their home system, a visitor ID will be assigned from a pool of visitor IDs.

INDEX

A

ABNF, defined 7-1
adding
- announcement group 4-10
- group home ranges 4-13
- multiple groups 4-10
- multiple subscribers 4-6
- new location 4-11
- single group 4-8
- single subscriber 4-4
- subscriber home ranges 4-12
- system group 4-10
- user 4-16

alias, defined 7-1
APCO
- defined 7-1
- project 25 7-1

audit log window 4-17

C

COTS, defined 7-1

D

delayed inhibit success 4-22
deleting an entry 4-20

E

entries
- deleting 4-20
- modifying 4-20

exporting data to CSV 4-24

F

filtering tables 4-19
FNE, defined 7-1

G

GID, defined 7-1
group home RFSSS window 4-13
groups window 4-7

H

hardware requirements 1-2
help, finding 4-24
hiding table columns 4-19
HLR, defined 7-1
homed, defined 7-1

I

IMBE, defined 7-2
inhibit
- successful 4-21
- unsuccessful 4-22

inhibit/uninhibit does not function 6-4
inhibited, defined 7-2
IP, defined 7-2
ISSI, defined 7-2

L

last registration, defined 7-2
location, defined 7-2
locations, window 4-11
logging in to the NLR web interface 4-2
lra, defined 7-2

M

maintenance operations 4-21
modifying an entry 4-20

N

network interface function (NIF) 2-1, 3-2
NIF, defined 7-2
NLR
  defined 7-2
  description 1-1
  fails to connect to MySQL Server 6-2
  redirection / logout does not function correctly 6-3
  web interface 4-2
  web interface does not appear 6-1
  web interface error 6-3
  web interface overview 2-1
NLR database, manually creating and managing 5-1
NMS, defined 7-2

P

P25, defined 7-2
persistent display settings 4-24
platform requirements 1-2
printing data 4-24
PSTN, defined 7-2
PTT, defined 7-2

R

requirements
  hardware 1-2
  software 1-3
RF, defined 7-2
RFSS, defined 7-2
RNC
  cannot communicate with NLR 6-4
  defined 7-2
  to NLR interface 2-1
RPM, defined 7-2

S

SG, defined 7-3
SGID, defined 7-3
SIP, defined 7-3
SNMP, defined 7-3
software requirements 1-3
sorting options 4-19
status, defined 7-3
SU, defined 7-3
subscriber, defined 7-3
subscriber home RFSSs window 4-12
subscribers window 4-3
SUID, defined 7-3
system audit log 4-17
system overview 1-1
system role
  creating 4-15
  deleting 4-15
  editing 4-15
system users 4-16

T

TGID, defined 7-3
TIA, defined 7-3

trunked operation 7-3

U

UDP, defined 7-3
uninhibit
    successful 4-23
    unsuccessful 4-23
unit ID, defined 7-3
user
    deleting 4-17
    editing 4-16
user/roles window 4-14

V

visitor, defined 7-3

W

WACN, defined 7-3
web interface 3-1
    subscriber inhibit 4-21
    subscriber uninhibit 4-23
WGID, defined 7-4
WUID, defined 7-4