DIH 1.2

Alarm Forwarding Administration Guide

910-6508-001 Revision A

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Chapter 1

About This Help Text

Topics:

Alarm Forwarding Overview

NSP Alarm Forwarding (Alarm Forwarding) enables the user to forward alarms to specified destinations. The user can create alarm forwarding rules using Filters.

This application handles several types of alarms, including those pertaining to

- Traffic supervision
- Quality of service
- SS7 network (nodes, linksets, links)
- System errors

Alarm Forwarding Scope and Audience

This user's guide provides information about the Network Software Platform (NSP) Alarm Forwarding application. This guide provides definitions and instructions to help the user efficiently and effectively define conditions and destinations for forwarding Alarms. The audience for this manual is the NSP ConfigManager and NSPConfigPowerUser.

About the Diameter Intelligence Hub (DIH)

The Diameter Intelligent Hub (DIH) is used to monitor a LTE network. DIH also creates a small hardware "footprint" for customers who administer 3G and 4G diameter networks. The DIH:

- Is a single blade server and storage blade collocated within a single or dual Diameter Signaling Router (DSR) enclosure(s).
- Provides filtering, data feed, tracing, decoding, and SNMP functions.
- Enables the selective collection and storage of diameter traffic within one or more instances of PMF and IXP.
- Provides nodal diameter troubleshooting.
- Provides data export for diameter messages.
- Supports both IPv4 and IPv6 traffic simultaneously.
- Provides KPI tracking using ProTrace application as well as viewing KPIs in graphic format using ProPerf dashboard configured at installation.
- Provides filtering for alarms using ProTraq Cell filter (see system alarms online help).
- Uses diameter protocol exclusively.

  Note: The DIH system can use other protocols if the Diameter mode has not been selected and system is in Standard mode. (Default setting is Standard mode. For more information on selecting Diameter mode, see Centralized Configuration Manager Administration online help, "Setting System to Diameter Mode."

The Diameter Protocol

The diameter protocol has evolved from the Radius protocol and enables diameter applications to extend the base protocol by adding new commands and/or attributes, such as those for use of the Extensible Authentication Protocol (EAP).

The diameter protocol provides for an Authentication, Authorization, and Accounting (AAA) framework that overcomes the limitations of RADIUS, (a protocol that handles AAA and EAP), which cannot effectively deal well with remote access, IP mobility and policy control. The Diameter protocol defines a policy protocol used by clients to perform Policy, AAA and Resource Control. This allows a single server to handle policies for many services.

As mentioned above, Diameter protocol provides AAA functionality, but in addition it is made more reliable by using TCP and SCTP instead of UDP. The Diameter protocol is further enhanced by the development of the 3rd Generation Partnership Project (3GPP) IP Multimedia Subsystem (IMS). Through the use of extensions, the protocol was designed to be extensible to support Proxies, Brokers, Strong Security, Mobile-IP, Network Access Servers (NASREQ), Accounting and Resource Management.

Setting User Preferences

Users can set User Preferences that apply across all the NSP applications. These include

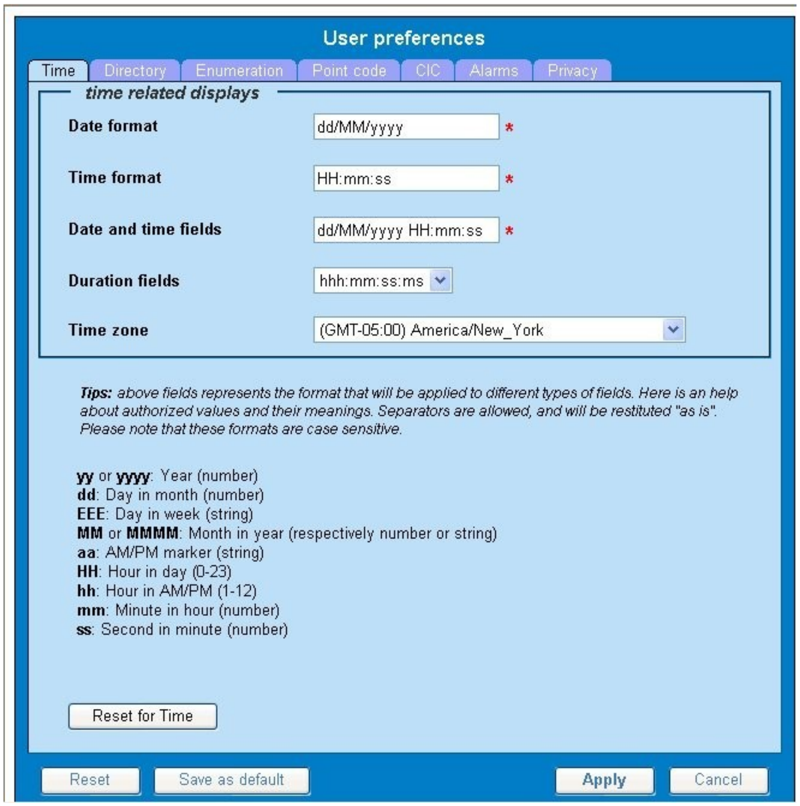
- Time specifications (date format, time zone, etc.)
- Directory names (for exporting, uploading, and downloading)
- Enumeration values (numerals vs. text)
- Point code specifications
- CIC specifications
- Default alarm colors
- Default object privacy privileges

Setting Time Format

Follow these steps to set the time format:

1. Click **User Preferences** on the Application board.
   The User Preferences page is displayed.
2. Click the **Time** tab.
   The Time page is displayed. The red asterisk denotes a required field.

   Note: Use the tips on the page to help you configure the time format.



time related displays

Date format dd/MM/yyyy *

Time format HH:mm:ss *

Date and time fields dd/MM/yyyy HH:mm:ss *

Duration fields hhh:mm:ss:ms

Time zone (GMT-05:00) America/New_York

Tips: *above fields represents the format that will be applied to different types of fields. Here is an help about authorized values and their meanings. Separators are allowed, and will be restituted "as is". Please note that these formats are case sensitive.*

yy or **yyyy**: Year (number)
dd: Day in month (number)
EEE: Day in week (string)
MM or **MMMM**: Month in year (respectively number or string)
aa: AM/PM marker (string)
HH: Hour in day (0-23)
hh: Hour in AM/PM (1-12)
mm: Minute in hour (number)
ss: Second in minute (number)

Figure 1: Time Formatting Page

3. Enter the format for these time-related displays.

   - **Date format**
   - **Time format**
   - **Date and time fields**

4. Select the formats for these time-related displays by using the drop-down arrow.

   - **Duration fields**
   - **Time zone**

   Note: You must choose your time zone to get local time.

5. If you want to reset the time-related displays to default settings, click **Reset for Time**. (The bottom **Reset** button resets all the tabbed pages to default settings.)
6. Click **Apply** to save settings.

Setting Directory Preferences

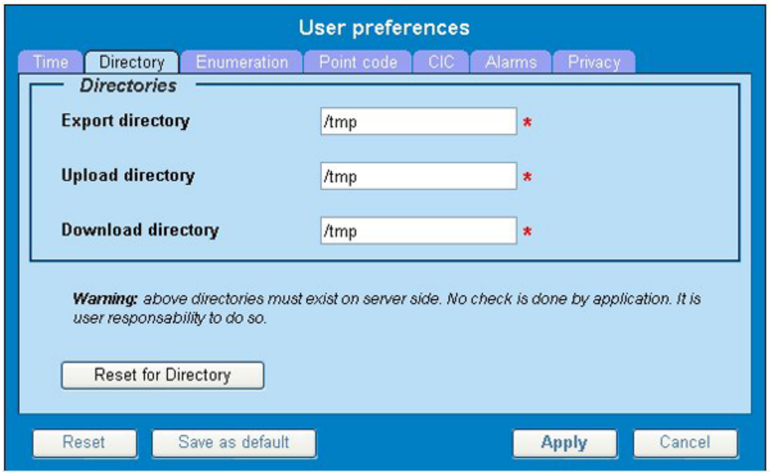
Use the User Preferences feature to set the Export, Upload and Download directory paths for your system. These paths define where xDR's, dictionary files and other elements are stored.

Follow these steps to set the directory preferences.

1. Click **User Preferences** on the Application board.

   The User Preferences page is displayed.

2. Click the **Directory** tab.
   The Directory page is displayed. The red asterisk denotes a required field.



Export directory /tmp *

Upload directory /tmp *

Download directory /tmp *

Warning: above directories must exist on server side. No check is done by application. It is user responsability to do so.

Figure 2: Directory Page

3. Type in the following:

   - **Export directory**
   - **Upload directory**
   - **Download directory**

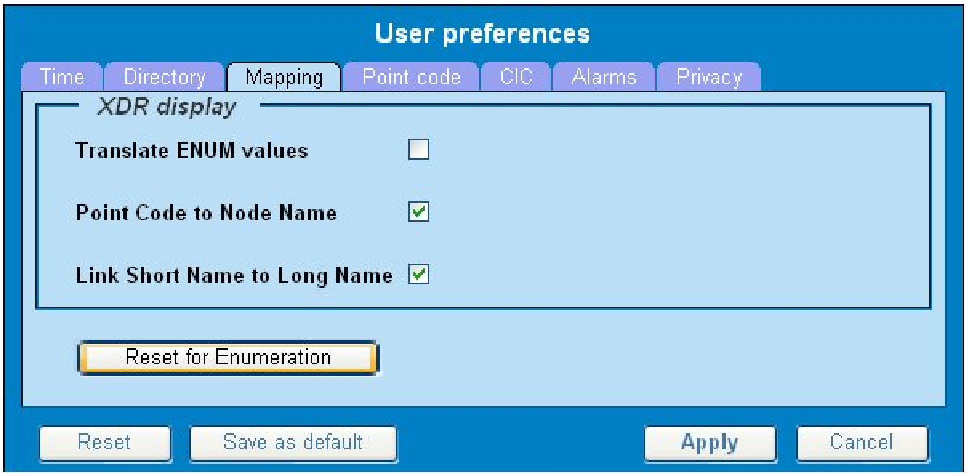
4. If you want to reset the directories to default settings, click **Reset for Directory.** (The bottom **Reset** button resets all the tabbed pages to default settings.)
5. Click **Apply** to save your settings.

Setting Mapping Preferences

You can set the Mapping settings using the User Preferences feature.

Follow these steps to set Mapping preferences.

1. Click **User Preferences** in the Application board.
   The User Preferences page is displayed.
2. Click the **Mapping** tab .
   The Mapping page is displayed.



XDR display

Translate ENUM values ☐

Point Code to Node Name ☑

Link Short Name to Long Name ☑

Figure 3: Mapping Page

3. Check **Translate ENUM values** to display text instead of numerals.

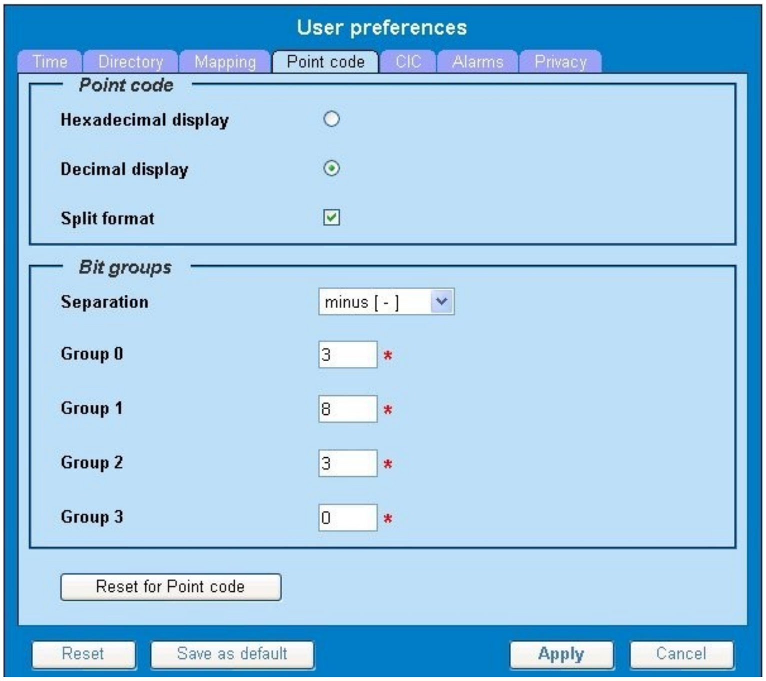
   Enumeration is used by xDRs to display text values instead of numeric. (For example, rather than showing the numeral for Alarm Severity, the user interface will show the actual word, such as "Major" or "Critical.")
4. Check **Point Code to Node Name** to display the custom (user-defined) name of the node. Otherwise, the Point Code value is displayed.
5. Check **Link Short Name to Long Name** to display the custom (user-defined) link name or the Eagle link name. Otherwise, the short name is displayed, which is the name that begins with an asterisk (*).
6. To reset the Mapping values to the default, click **Reset for Enumeration**. (The bottom **Reset** button resets all the tabbed pages to default settings.)
7. Click **Apply** to save the changes.

Setting Point Code Preferences

The User Preferences feature enables you to set the Point Code preferences for your system. A Point Code is a unique address for a node (Signaling Point), used to identify the destination of a message signal unit (MSU).

Follow these steps to set the Point Code preferences.

1. Click **User Preferences** in the Application board.
   The User Preferences page is displayed.
2. Click the **Point Code** tab.
   The Point Code page is displayed. The red asterisk denotes a required field.



Point code

Hexadecimal display ○

Decimal display ●

Split format ☑

Bit groups

Separation minus [-]

Group 0 3 *

Group 1 8 *

Group 2 3 *

Group 3 0 *

Figure 4: Point Code Tab

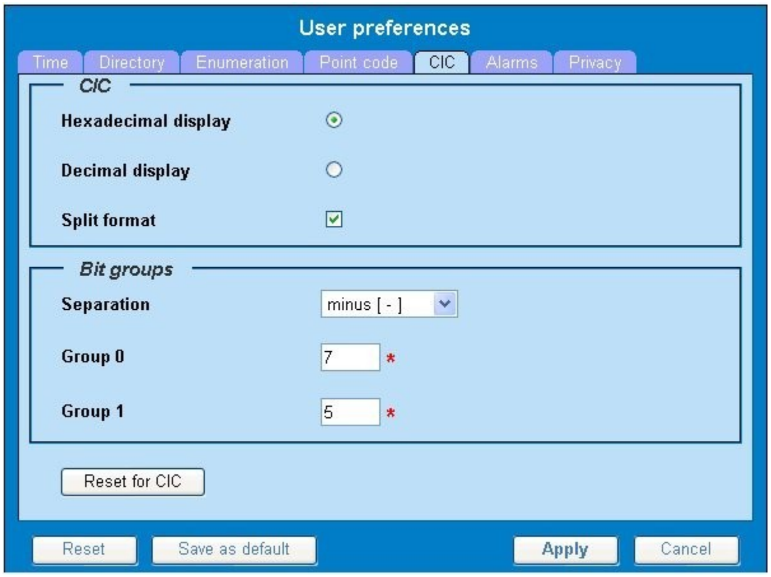
3. Select either **Hexadecimal display** or **Decimal display**.
4. Select or de-select **Split format**.
   If **Split format** is checked, the Bit groups settings in the box below are active. If **Split format** is not checked, Bit groups settings are not applicable.
5. If you selected Split format above, go to the next step. If you did not select Split format, go to step *Step 8*.
6. In the Bit groups panel, use the drop-down box to select the **Separation** type .
7. Type in values for **Groups 0-3**.
8. To reset the point code preferences to default settings, click **Reset for Point code**. (The bottom **Reset** button resets all the tabbed pages to default settings.)
9. Click **Apply** to save your settings.

Setting CIC Preferences

The Circuit Identification Code (CIC) provides a way to identify which circuit is used by the Message Signaling Unit (MSU). This is important in ProTrace applications. Use the User Preferences feature to set the CIC settings for your system.

Complete these steps to set the CIC preferences:

1. Click **User Preferences** in the Application board.
   The User preferences page is displayed.
2. Click the **CIC** tab.
   The CIC page is displayed. The red asterisk denotes a required field.



CIC

Hexadecimal display ●

Decimal display ○

Split format ☑

Bit groups

Separation: minus [-]

Group 0: 7 *

Group 1: 5 *

Figure 5: CIC Page

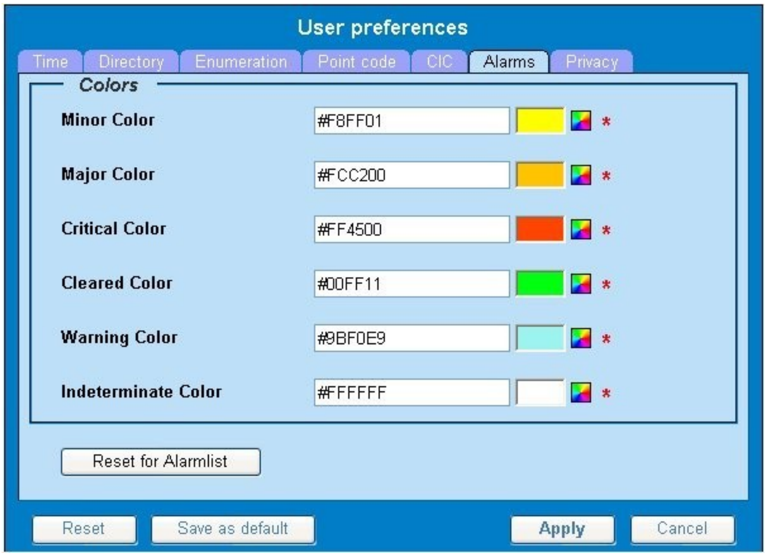
3. Select either **Hexadecimal display** or **Decimal display**.
4. Select or de-select **Split format**.
   If **Split format** is checked, the Bit groups settings in the box below are active. If **Split format** is not checked, Bit groups settings are not applicable.
5. If you selected Split format above, go to the next step. If you did not select Split format, go to step *Step 8*.
6. In the Bit groups panel, use the drop-down box to select **Separation** type..
7. Type in values for **Group 0** and **Group 1**.
8. If you want to reset CIC preferences to the default, click **Reset for CIC**. (The bottom **Reset** button resets all the tabbed pages to default settings.)
9. Click **Apply** to save your settings.

Setting Alarms Preferences

Use the Alarms tab in User Preferences to define the default colors that indicate alarm severity. The colors are displayed in the Perceived Severity column of alarms tables and on object icons in maps.

Follow these steps to modify alarm status colors.

1. Click **User Preferences** in the Application board.
   The User preferences page is displayed.
2. Click the **Alarms** tab.
   The Alarms page is displayed. The red asterisk denotes a required field.



Colors

Minor Color	#F8FF01 *
Major Color	#FCC200 *
Critical Color	#FF4500 *
Cleared Color	#00FF11 *
Warning Color	#9BF0E9 *
Indeterminate Color	#FFFFFF *

Figure 6: Alarms Page

3. Click the color palette (icon on the right side of the screen) associated with the alarm status color(s) you want to modify.
   A pop-up palette window is displayed.
4. Click the color you want for the type of alarm.
   The color palette pop-up is closed and the color box for the alarm displays the selected color. The number for the color is also displayed.
5. If you want to reset the Alarm preferences to the default, click **Reset for Alarmlist**. (The bottom **Reset** button resets all the tabbed pages to default settings.)
6. Click **Apply** .
   The changes do not take effect until you log out of and in again to NSP.

Setting Default Object Privacy

All NSP users can set default access privileges for Objects (data) they create in NSP applications. An owner has full rights to modify or delete the object . Other users are assigned to a Profile and have access to these Objects through that Profile's associated Privacy Roles.

To enter the default Object Privacy (data) settings, follow these steps:

1. Click **User preferences** in the Application board menu.
   The User Preferences window is displayed. The **Time** tab is active by default.
2. Click the **Privacy** tab .
   The Privacy page is displayed.

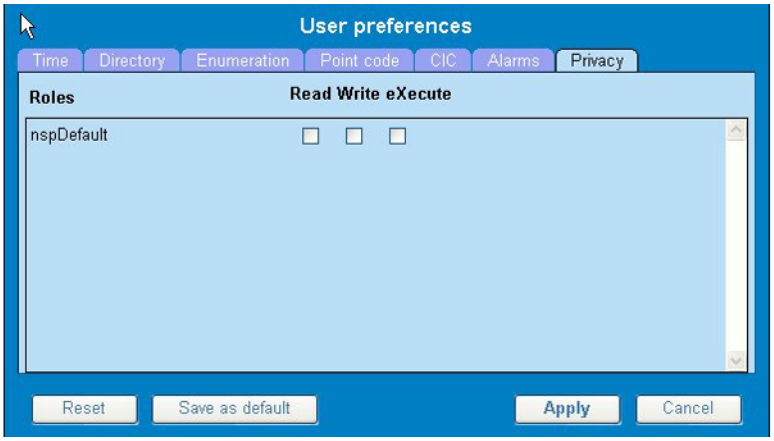


Figure 7: Privacy Page

3. Click the appropriate box to select **Read**, **Write**, or **eXecute**. If you want the role to have no access to the selected object(s), ensure that no box is checked.
4. Click **Save as default**.
5. To reset all the tabbed pages to default settings, click **Reset**.
6. Click **Apply**.
   The settings are saved.

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  - **Mexico**

    Phone:

    001-888-367-8552
  - **Peru**

    Phone:

    0800-53-087
  - **Puerto Rico**

    Phone:

    1-888-367-8552 (1-888-FOR-TKLC)
  - **Venezuela**

Phone:

0800-176-6497

- **Europe, Middle East, and Africa**

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  - **Software Solutions**

    Phone:

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DIH Documentation Library

DIH customer documentation and online help are created whenever significant changes are made that affect system operation or configuration. Revised editions of the documentation and online help are distributed and installed on the customer system. Consult your NSP Installation Manual for details on how to update user documentation. Additionally, a Release Notice is distributed on the Tekelec Customer Support site along with each new release of software. A Release Notice lists the PRs that have been resolved in the current release and the PRs that are known to exist in the current release.

Listed is the entire DIH documentation library of online help.

- Centralized Configuration Manager Administration Online Help
- Alarm Forwarding Administration Online Help

- Diagnostic Utility Administration Online Help
- ProTrace Online Help
- System Alarms Online Help
- ProPerf Online Help
- ProTraq Configuration Online Help
- Data Feed Export Online Help
- Report Server Platform Online Help

Locate Product Documentation on the Customer Support Site

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1. Log into the *Tekelec Customer Support* site.

   Note: If you have not registered for this new site, click the **Register Here** link. Have your customer number available. The response time for registration requests is 24 to 48 hours.

2. Click the **Product Support** tab.
3. Use the Search field to locate a document by its part number, release number, document name, or document type. The Search field accepts both full and partial entries.
4. Click a subject folder to browse through a list of related files.
5. To download a file to your location, right-click the file name and select **Save Target As**.

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Patents

This product may be covered by one or more of the following U.S. and foreign patents:

U.S. Patent Numbers:

6,456,845; 6,765,990; 6,968,048; 7,043,001; 7,155,512; 7,206,394; 7,215,748; 7,231,024; 7,286,516; 7,286,647; 7,401,360; 7,706,343; 7,844,033; 7,860,799;

Foreign Patent Numbers:

None.

Chapter 2

Introduction to NSP Alarm Forwarding

Topics:

Alarm Forwarding Key Features

Alarm Forwarding is part of Tekelec's Network Software Platform (NSP) toolkit. Key features include

- A Simple Network Management Protocol (SNMP) agent compliant with ITU x721, X733
- A Dedicated Access Module for HP TeMIP
- Trap sent reliability
  - Sequence number is added to trap sent.
  - Telecommunications Management Network (TMN) can check that none were lost.
  - Re-synchronization is available.
- Acknowledge / Terminate capability from SNMP
  - Two alarm attributes are writable:
    - Perceived Severity: Setting the value to 5 (clear) terminates the alarm in the NSP database.
    - Acknowledged: Setting the value to 1 acknowledges the alarm in the NSP database.
  - Terminate or Acknowledge action is associated with a user ID in the NSP database.
- For an alarm event, only one email is sent to a selective list of email addresses. Alarm Forwarding allows a list of email addresses to be attached to a filter. It is possible to send a particular type of alarm to a list of email addresses and another type of alarm to a different list of email addresses. These mutiple email address are set when Creating a Filter and Editing a Filter.

  Each alarm is evaluated against each filter. The same alarm can pass different filter conditions and be sent to different destinations. If the same alarm passes different filters and is forwarded using SNMP in each of those filters, the alarm is sent only once since Alarm Forwarding detects this condition and SNMP has only one destination.

Also see *NSP Forwarding MIB*.

Alarm Forwarding Architecture

Alarm Forwarding supports the forwarding of alarms to applications in an external system. It supports the following two protocols for alarm forwarding:

- Traps (SNMP)
- Mails (SMTP)

Alarm Forwarding supports the use of Filters. You can create, edit, and delete a Filter and select a forwarding destination. A Filter List provides the following information for a Filter:

- Rec No - record number; a number given for indexing alarms in the Filter alarm list
- Filter ID - unique system-generated number that identifies the Filter
- Filter Name - name of the Filter
- Destination Name - destination of the filtered alarm. It can be SNMP or SMTP or both.

You can set the forwarding criteria based on the Filters defined for the following fields:

- Ack State
- Alarm Cleared User
- Alarm ID
- Alarm Type
- Managed Object Class
- Managed Object ID
- Perceived Severity ID
- Probable Cause
- Specific Problem
- User Name

Note: Destination configuration is part of platform configuration. These steps (SMTP server, SNMP version, and target IP) are described in NSP installation.

Chapter 3

Working in Alarm Forwarding

Topics:

Accessing Alarm Forwarding

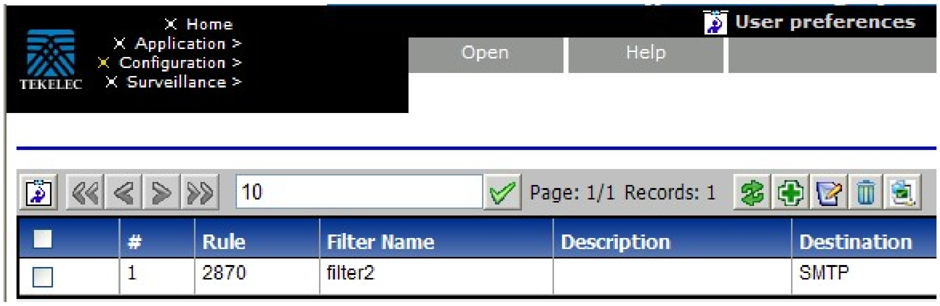
To open Alarm Forwarding, follow these steps:

Note: NSP only supports versions of IE 7.0 or later and Firefox 3.6 or later. Before using NSP, turn off the browser pop up blocker for the NSP site.

1. Log in to NSP .
   The NSP Application board is displayed.
2. Click **Alarm Forwarding**.
   The Alarm Forwarding home page is displayed.

Understanding Alarm Forwarding Components

The figure below shows the Alarm Forwarding page with the toolbar and Filters list. Toolbar icons are explained in the table below the figure.



□	#	Rule	Filter Name	Description	Destination
□	1	2870	filter2		SMTP

Figure 8: Alarm Forwarding Page

Alarm Forwarding Toolbar

Table 1: Alarm Forwarding Toolbar Icons

Icon	Explanation
⏩	Navigation arrow -- moves back and forth among the records. This example is the arrow to move to next page.
⊕	Filter -- adds a Filter, defining the types of alarms to be forwarded and their destination
▤	Column Select Record -- sets the order of the columns
✎	Edit Filter -- edits an existing filter's definition
🗑	Delete Filter -- deletes a selected filter

Icon	Explanation
⟳	Refresh Page -- resets display to include the most current data
10	Records Per Page -- number of records to display on a page
✓	Change Records per Page -- resets display to include the number of Records per Page

Note: Do not use the Function Keys (F1 through F12) when using NSP. Function keys work in unexpected ways. For example, the F1 key does not open NSP help but opens the help for the browser in use. The F5 key does not refresh a specific screen, but refreshes the entire session and results in a loss of any entered information.

Using Alarm Forwarding

This section explains how to set conditions and destinations for forwarding alarms.

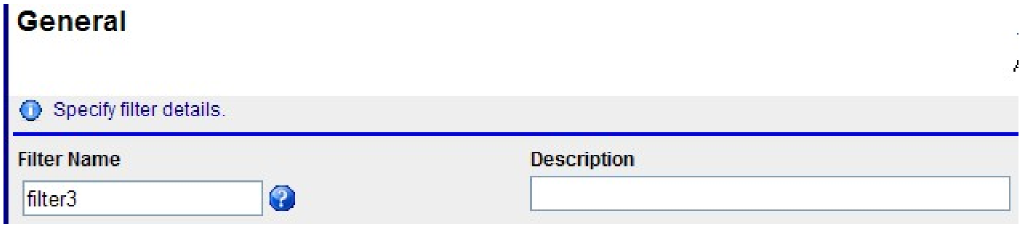
Creating a Filter

Filters define the types of alarms to be forwarded and their destination. Filters return True or False results depending upon whether the alarm should be forwarded or not. Each Filter that returns True is forwarded to its specified destination.

To create a Filter,

1. Click the Add Filter icon ⊞ on the toolbar.

   The Create new Filter dialog is displayed.



General

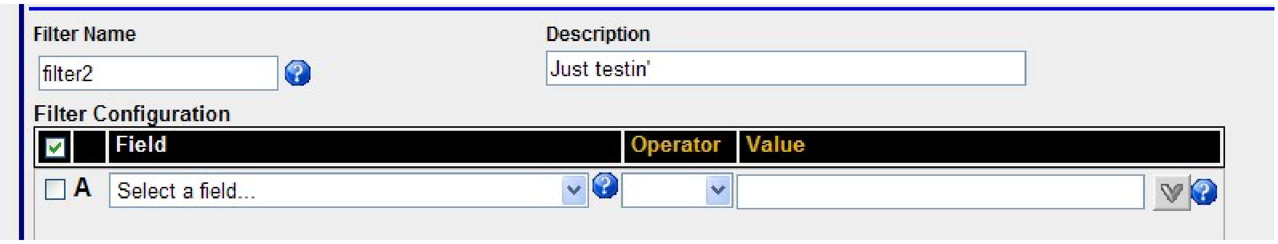
Specify filter details.

Filter Name: filter3

Description:

Figure 9: Create New Filter Dialog

2. Type in a **Filter Name** and **Description**.
3. Type in Description.
4. Select Filter and ⊞ (Add).
5. Select a Field, Operator, and Value from the drop-down menus.



Filter Name: filter2

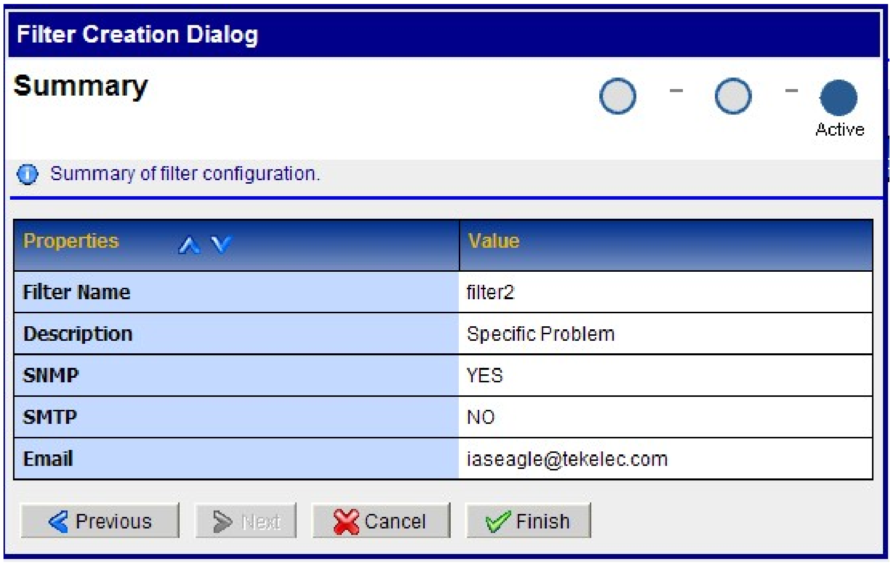
Description: Just testin'

Filter Configuration

☑		Field	Operator	Value
☐	A	Select a field...		

Figure 10: Filter Configuration Display

6. Enter an Expression.
7. Select Next to advance tio the Destination display.
8. Select SNMP and/or SMTP.
9. Enter Email list (addresses) information.
10. To advance to the Filter Creation Dialog Summary display, select Next .



Filter Creation Dialog

Summary

Summary of filter configuration.

Properties	Value
Filter Name	filter2
Description	Specific Problem
SNMP	YES
SMTP	NO
Email	iaseagle@tekelec.com

Figure 11: Summary Dialog Display

11. If ths information on the Summary display is correct, select finish create this filter. If there are errors in this summary information, select the previous to return to the display to correct the errors.
12. To add another filter, repeat from *Step 1*.

Editing a Filter

To edit an existing Filter:

1. Select a Filter from the Filter table.
2. Click the Edit Filter icon on the toolbar.
   The Filter Creation Dialog is displayed.
3. Modify the appropriate field(s) as needed.

For specific information on fields and options, see *Creating a Filter*.

4. Click **Next**.
   The Select Forwarding Destination dialog is displayed.
5. Update Destination information as necessary.

   Note: For SNMP, only one trap destination can be defined. For SMTP, multiple email destinations are permitted.

6. Click **Finish** to save the record changes.

Alarm Forwarding Test Connection

This section provides additional information referenced from the

```
Connection Test Dialog
```

screen when using the **Test Connection** GUI icon.

Test Connection for SMTP

The configurator should verify the SMTP address, SMTP availability thru firewalls, and SMTP access mode. Secured destinations require additional parameters be defined and are described in the Installation Document.

1. If the message was received in the targeted mail box, the test was successful. This procedure is complete.

   If the message is not in the targeted mail box, continue with this procedure.
2. Use the `Audit Viewer` application to verify if a mail sending error is logged.
3. Contact the Tekelec *Customer Care Center* to investigate and help determine the correct SMTP configuration.

Test Connection for SNMP

The configurator should check the JMX agent log on the NSP primary to identify any SNMP agent configuration errors, verify the SNMP address, and the SNMP availability thru firewalls. Secured destinations require additional parameters be defined and are described in the Installation Document.

1. Verify the test trap was received by the management system. If the test trap was received by the management system, the test was successful. This procedure is complete.

   If the test trap was not received by the management system, continue with this procedure.
2. Contact the Tekelec *Customer Care Center* to investigate and help determine the correct SNMP configuration.

Chapter 4

SNMP Agent

Topics:

SNMP Overview

The main features of the Simple Network Management Protocol (SNMP) agent of Network Software Platform (NSP) Forwarding are explained below.

Overview of NSP Database

- The Management Information Base (MIB) contains Managed Object types, Managed Objects, and opened alarms in specific tables.
- The MIB is loaded at SNMP agent startup with metadata and opened alarms already forwarded.

Validation of Traps Sent

- Traps contain a sequence number (since agent startup) that permits Telecommunications Management Network (TMN) to check that none were lost.
- In case of a gap (lost trap) or if the number is lower, the process is restarted and TNM can re-synchronize its database by querying the opened alarms table.

Acknowledgement or Termination from SNMP

- Change in an alarm's writable attributes is reflected in ProAlarm Viewer and System Alarms.
  - Setting the NspAlarmAcknowledged attribute of an alarm table entry to `True (1)` acknowledges that alarm.
  - Setting the NspAlarmPerceivedSeverity attribute of an alarm table entry to `Cleared (5)` terminates an alarm.

A dedicated Access Module for HP TeMIP is available to integrate easily with the NSP Forwarding SNMP agent.

NSP Forwarding MIB

Shown here is the NSP-Forwarding-MIB , which is located on the NSP server at

```
usr/TKLC/nsp/nsp-package/forwarding/target/misc/NSP-FORWARDING-MIB


-- File Name : NSP-FORWARDING-MIB
-- Date      : Mon Nov 21 10:18:28 CET 2006
-- Author    : AdventNet Agent Toolkit Java Edition - MIB Editor 6




NSP-FORWARDING-MIB DEFINITIONS ::= BEGIN
        IMPORTS
                RowStatus, DisplayString
                        FROM SNMPv2-TC
                NOTIFICATION-GROUP, OBJECT-GROUP
                        FROM SNMPv2-CONF
                enterprises, MODULE-IDENTITY, OBJECT-TYPE, Integer32,
NOTIFICATION-TYPE
                        FROM SNMPv2-SMI;
        steleus MODULE-IDENTITY
                LAST-UPDATED    "200602131148Z"
                ORGANIZATION    "Tekelec"
                CONTACT-INFO    "ttprocessing@tekelec.com"
                DESCRIPTION             "Description"
                REVISION                "200602131148Z"
                DESCRIPTION             "NSP module"
                ::=  {  enterprises  4404  }

        nsp     OBJECT IDENTIFIER
                ::=  {  steleus  8  }

        forwarding      OBJECT IDENTIFIER
                ::=  {  nsp  6  }

        nspManagedObjectClassTable      OBJECT-TYPE
                SYNTAX          SEQUENCE  OF  NspManagedObjectClassEntry
                MAX-ACCESS      not-accessible
                STATUS          current
                DESCRIPTION     "NSP managed object class table"
                ::=  { forwarding  1 }

        nspManagedObjectClassEntry      OBJECT-TYPE
                SYNTAX          NspManagedObjectClassEntry
                MAX-ACCESS      not-accessible
                STATUS          current
                DESCRIPTION     "NSP managed object class entry"
                INDEX           {  nspManagedObjectClassId  }
                ::=  { nspManagedObjectClassTable 1 }

        NspManagedObjectClassEntry  ::=  SEQUENCE {
                nspManagedObjectClassId  Integer32,
                nspManagedObjectClassName  DisplayString,
                nspManagedObjectClassDescription  DisplayString,
                nspManagedObjectClassRowStatus  RowStatus
                }



        nspManagedObjectClassId OBJECT-TYPE
                SYNTAX                  Integer32  ( -2147483648 .. 2147483647  )
                MAX-ACCESS              read-only
                STATUS                  current
                DESCRIPTION             "Value that defines an instance of managed
 object class in the table"
                ::=  {  nspManagedObjectClassEntry  1  }



        nspManagedObjectClassName       OBJECT-TYPE
                SYNTAX                  DisplayString
                MAX-ACCESS              read-only
                STATUS                  current
                DESCRIPTION             "NSP managed object class instance name"
                ::=  {  nspManagedObjectClassEntry  2  }



        nspManagedObjectClassDescription        OBJECT-TYPE
                SYNTAX                  DisplayString
                MAX-ACCESS              read-only
                STATUS                  current
                DESCRIPTION             "NSP managed object class instance
description"
                ::=  {  nspManagedObjectClassEntry  3  }
```

```
       nspManagedObjectClassRowStatus  OBJECT-TYPE
               SYNTAX                  RowStatus  { active ( 1 ) , notInService (
2 ) , notReady ( 3 ) , createAndGo ( 4 ) , createAndWait ( 5 ) , destroy ( 6 ) }

               MAX-ACCESS              read-create
               STATUS                  current
               DESCRIPTION             "SMI v2 required attribute"
               ::=  {  nspManagedObjectClassEntry  50  }

       nspManagedObjectTable   OBJECT-TYPE
               SYNTAX          SEQUENCE  OF  NspManagedObjectEntry
               MAX-ACCESS      not-accessible
               STATUS          current
               DESCRIPTION     "Description"
               ::=  { forwarding  2 }

       nspManagedObjectEntry   OBJECT-TYPE
               SYNTAX          NspManagedObjectEntry
               MAX-ACCESS      not-accessible
               STATUS          current
               DESCRIPTION     "Row Description"
               INDEX           {  nspManagedObjectId}
               ::=  { nspManagedObjectTable 1 }

       NspManagedObjectEntry  ::=  SEQUENCE {
               nspManagedObjectId  Integer32,
               nspManagedObjectName  DisplayString,
               nspManagedObjectClassIdRef  Integer32,
               nspManagedObjectParent  Integer32,
               nspManagedObjectRowStatus  RowStatus
               }



       nspManagedObjectId      OBJECT-TYPE
               SYNTAX                  Integer32  ( -2147483648 .. 2147483647  )
               MAX-ACCESS              read-only
               STATUS                  current
               DESCRIPTION             "Value that defines an instance of managed
object in the table"
               ::=  {  nspManagedObjectEntry  1  }



       nspManagedObjectName    OBJECT-TYPE
               SYNTAX                  DisplayString
               MAX-ACCESS              read-only
               STATUS                  current
               DESCRIPTION             "Column Description"
               ::=  {  nspManagedObjectEntry  2  }



       nspManagedObjectClassIdRef      OBJECT-TYPE
               SYNTAX                  Integer32  ( -2147483648 .. 2147483647  )
               MAX-ACCESS              read-only
               STATUS                  current
               DESCRIPTION             "Value that defines an instance of managed
object class"
               ::=  {  nspManagedObjectEntry  10  }
```

```
        nspManagedObjectParent  OBJECT-TYPE
                SYNTAX                  Integer32
                MAX-ACCESS              read-only
                STATUS                  current
                DESCRIPTION             "Value that defines an instance of parent
managed object"
                ::=  {  nspManagedObjectEntry  20  }



        nspManagedObjectRowStatus       OBJECT-TYPE
                SYNTAX                  RowStatus
                MAX-ACCESS              read-create
                STATUS                  current
                DESCRIPTION             "SMI v2 required attribute"
                ::=  {  nspManagedObjectEntry  50  }

        nspAlarmsTable  OBJECT-TYPE
                SYNTAX          SEQUENCE  OF  NspAlarmsEntry
                MAX-ACCESS      not-accessible
                STATUS          current
                DESCRIPTION     "NSP forwarded opened alarms table"
                ::=  { forwarding  3 }

        nspAlarmsEntry  OBJECT-TYPE
                SYNTAX          NspAlarmsEntry
                MAX-ACCESS      not-accessible
                STATUS          current
                DESCRIPTION     "NSP forwarded opened alarms entry"
                INDEX           {  nspAlarmId  }
                ::=  { nspAlarmsTable 1 }

        NspAlarmsEntry  ::=  SEQUENCE {
                nspManagedObjectIdRef  Integer32,
                nspAlarmId  Integer32,
                nspAlarmRowStatus  RowStatus,
                nspManagedObjectDN  DisplayString,
                nspAlarmLastEventTime  DisplayString,
                nspAlarmEventType  INTEGER,
                nspAlarmProbableCause  INTEGER,
                nspAlarmPerceivedSeverity  INTEGER,
                nspAlarmTrendIndication  INTEGER,
                nspAlarmThresholdLevel  DisplayString,
                nspAlarmObservedValue  DisplayString,
                nspAlarmAdditionalText  DisplayString,
                nspAlarmSpecificProblem  DisplayString,
                nspAlarmFirstDate  OCTET STRING,
                nspAlarmClearDate  OCTET STRING,
                nspAlarmCriticalCount  Integer32,
                nspAlarmMajorCount  Integer32,
                nspAlarmMinorCount  Integer32,
                nspAlarmWarningCount  Integer32,
                nspAlarmAcknowledged  INTEGER
                }



        nspManagedObjectIdRef   OBJECT-TYPE
                SYNTAX                  Integer32  ( -2147483648 .. 2147483647  )
                MAX-ACCESS              read-only
                STATUS                  current
               DESCRIPTION            "Value that refers to managed object involved
 in the forwarded alarm"
                ::=  {  nspAlarmsEntry  1  }
        nspAlarmId      OBJECT-TYPE
                SYNTAX                  Integer32  ( -2147483648 .. 2147483647  )
                MAX-ACCESS              read-only
                STATUS                  current
               DESCRIPTION            "Value that defines an instance of forwarded
 alarm"
                ::=  {  nspAlarmsEntry  2  }



        nspAlarmRowStatus       OBJECT-TYPE
                SYNTAX                  RowStatus  { active ( 1 ) , notInService (
 2 ) , notReady ( 3 ) , createAndGo ( 4 ) , createAndWait ( 5 ) , destroy ( 6 ) }

                MAX-ACCESS              read-create
                STATUS                  current
                DESCRIPTION             "SMI v2 required attribute"
                ::=  {  nspAlarmsEntry  50  }



        nspManagedObjectDN      OBJECT-TYPE
                SYNTAX                  DisplayString
                MAX-ACCESS              read-only
                STATUS                  current
                DESCRIPTION             "Distinguished name that refers to managed
 object involved in the forwarded alarm"

                ::=  {  nspAlarmsEntry  100  }

        nspAlarmLastEventTime   OBJECT-TYPE
                SYNTAX                  DisplayString
                MAX-ACCESS              read-only
                STATUS                  current
                DESCRIPTION             "Last event time in ASN.1 format
                                for the last event of the NSP forwarded alarm on
the managed object"
                ::=  {  nspAlarmsEntry  1000  }



        nspAlarmProbableCause   OBJECT-TYPE
                SYNTAX                  INTEGER  { adapterError ( 1 ) ,
applicationSubsystemFailure ( 2 ) , bandwidthReduced ( 3 ) , callEstablishmentError
 ( 4 ) , communicationsprotocolError ( 5 ) , communicationsSubsystemFailure ( 6 )
, configurationOrCustomizationError ( 7 ) , congestion ( 8 ) , corruptData ( 9 ) ,
 cpuCyclesLimitExceeded ( 10 ) , dataSetOrModemError ( 11 ) , degradedSignal ( 12
) , dteDceInterfaceError ( 13 ) , enclosureDoorOpen ( 14 ) , equipmentMalfunction
( 15 ) , excessiveVibration ( 16 ) , fileError ( 17 ) , fireDetected ( 18 ) ,
floodDetected ( 19 ) , framingError ( 20 ) , heatingVentCoolingSystemnspblem ( 21
) , humidityUnacceptable ( 22 ) , inputOutputDeviceError ( 23 ) , inputDeviceError
 ( 24 ) , lanError ( 25 ) , leakDetected ( 26 ) , localNodeTransmissionError ( 27
) , lossOfFrame ( 28 ) , lossOfSignal ( 29 ) , materialSupplyExhausted ( 30 ) ,
multiplexerproblem ( 31 ) , outOfMemory ( 32 ) , ouputDeviceError ( 33 ) ,
performanceDegraded ( 34 ) , powerproblem ( 35 ) , pressureUnacceptable ( 36 ) ,
processorproblem ( 37 ) , pumpFailure ( 38 ) , queueSizeExceeded ( 39 ) ,
receiveFailure ( 40 ) , receiverFailure ( 41 ) , remoteNodeTransmissionError ( 42
) , resourceAtOrNearingCapacity ( 43 ) , responseTimeExecessive ( 44 ) ,
retransmissionRateExcessive ( 45 ) , softwareError ( 46 ) ,
softwareprogramAbnormallyTerminated ( 47 ) , softwareprogramError ( 48 ) ,
storageCapacityproblem ( 49 ) , temperatureUnacceptable ( 50 ) , thresholdCrossed
( 51 ) , timingproblem ( 52 ) , toxicLeakDetected ( 53 ) , transmitFailure ( 54 )
, transmitterFailure ( 55 ) , underlyingResourceUnavailable ( 56 ) , versionMismatch
 ( 57 ) , authenticationFailure ( 58 ) , breachOfConfidentiality ( 59 ) , cableTamper
 ( 60 ) , delayedInformation ( 61 ) , denialOfService ( 62 ) , duplicateInformation
 ( 63 ) , informationMissing ( 64 ) , informationModificationDetected ( 65 ) ,
informationOutOfSequence ( 66 ) , intrusionDetection ( 67 ) , keyExpired ( 68 ) ,
nonRepudiationFailure ( 69 ) , outOfHoursActivity ( 70 ) , outOfService ( 71 ) ,
proceduralError ( 72 ) , unauthorizedAccessAttempt ( 73 ) , unexpectedInformation
( 74 ) }

                MAX-ACCESS              read-only
                STATUS                  current
                DESCRIPTION             "Represents the probable cause values for
the alarms as per [X.721], [X.733] and [X.736]

                                for the NSP forwarded alarm on the managed object"

                ::=  {  nspAlarmsEntry  1001  }



        nspAlarmPerceivedSeverity       OBJECT-TYPE
                SYNTAX                  INTEGER  { indeterminate ( 0 ) , critical
( 1 ) , major ( 2 ) , minor ( 3 ) , warning ( 4 ) , cleared ( 5 ) }

                MAX-ACCESS              read-write
                STATUS                  current
                DESCRIPTION             "Represents the perceived severity values
for the alarms as per [X.733] and [X.721]

                               for the NSP  forwarded alarm on the managed object"

                ::=  {  nspAlarmsEntry  1002  }



        nspAlarmTrendIndication OBJECT-TYPE
                SYNTAX                  INTEGER  { lessSevere ( 0 ) , noChange ( 1
 ) , moreSevere ( 2 ) }
                MAX-ACCESS              read-only
                STATUS                  current
               DESCRIPTION             "Represents the trend indication values for
 the alarms as per [X.733]
                                for the NSP forwarded alarm on the managed object"

                ::=  {  nspAlarmsEntry  1003  }



        nspAlarmThresholdLevel  OBJECT-TYPE
                SYNTAX                  DisplayString
                MAX-ACCESS              read-only
                STATUS                  current
                DESCRIPTION             "Represents the threshold level indication
 values (real) for the alarms as per [X.733]

                                for the last event of the NSP forwarded alarm on
the managed object"
                ::=  {  nspAlarmsEntry  1004  }



        nspAlarmObservedValue   OBJECT-TYPE
                SYNTAX                  DisplayString
                MAX-ACCESS              read-only
                STATUS                  current
                DESCRIPTION             "Represents the threshold observed values
(real) for the alarms as per [X.733]
                                for the last event of the NSP forwarded alarm on
the managed object"
                ::=  {  nspAlarmsEntry  1005  }



        nspAlarmAdditionalText  OBJECT-TYPE
                SYNTAX                  DisplayString
                MAX-ACCESS              read-only
                STATUS                  current
                DESCRIPTION             "Represents the additional text field for
the alarm as per [X.733]
                                for the last event of the NSP forwarded alarm on
the managed object"
                ::=  {  nspAlarmsEntry  1006  }

        nspAlarmEventType       OBJECT-TYPE
                SYNTAX                  INTEGER  { otherAlarm ( 1 ) ,
communicationAlarm ( 2 ) , environmentalAlarm ( 3 ) , equipmentAlarm ( 4 ) ,
integrityViolation ( 5 ) , processingErrorAlarm ( 10 ) , qualityOfServiceAlarm ( 11
 ) }

                MAX-ACCESS              read-only
                STATUS                  current
                DESCRIPTION             "Represents the ITU event type value for
the alarms as per [X.721], [X.733] and [X.736]

                                for the NSP forwarded alarm on the managed object"

                ::=  {  nspAlarmsEntry  1007 }

        nspAlarmSpecificProblem OBJECT-TYPE
                SYNTAX                  DisplayString
                MAX-ACCESS              read-only
                STATUS                  current
                DESCRIPTION             "Represents the specific problem name
                                for the NSP forwarded alarm on the managed object"

                ::=  {  nspAlarmsEntry  1008  }



        nspAlarmFirstDate       OBJECT-TYPE
                SYNTAX                  OCTET STRING
                MAX-ACCESS              read-only
                STATUS                  current
                DESCRIPTION             "Represents the raised date in ASN.1 format

                                for the NSP forwarded alarm on the managed object"

                ::=  {  nspAlarmsEntry  1010  }



        nspAlarmClearDate       OBJECT-TYPE
                SYNTAX                  OCTET STRING
                MAX-ACCESS              read-only
                STATUS                  current
                DESCRIPTION             "Represents the clear date in ASN.1 format

                                for the NSP forwarded alarm on the managed object"

                ::=  {  nspAlarmsEntry  1011  }
```

```
       nspAlarmCriticalCount   OBJECT-TYPE
               SYNTAX                  Integer32
               MAX-ACCESS              read-only
               STATUS                  current
               DESCRIPTION             "Represents the number of critical events
                               for the NSP forwarded alarm on the managed object"

               ::=  {  nspAlarmsEntry  1012  }



       nspAlarmMajorCount      OBJECT-TYPE
               SYNTAX                  Integer32
               MAX-ACCESS              read-only
               STATUS                  current
               DESCRIPTION             "Represents the number of major events
                               for the NSP forwarded alarm on the managed object"

               ::=  {  nspAlarmsEntry  1013  }



       nspAlarmMinorCount      OBJECT-TYPE
               SYNTAX                  Integer32
               MAX-ACCESS              read-only
               STATUS                  current
               DESCRIPTION             "Represents the number of minor events
                               for the NSP forwarded alarm on the managed object"

               ::=  {  nspAlarmsEntry  1014  }



       nspAlarmWarningCount    OBJECT-TYPE
               SYNTAX                  Integer32
               MAX-ACCESS              read-only
               STATUS                  current
               DESCRIPTION             "Represents the number of warning events
                               for the NSP forwarded alarm on the managed object"

               ::=  {  nspAlarmsEntry  1015  }



       nspAlarmAcknowledged    OBJECT-TYPE
               SYNTAX                  INTEGER  { false ( 0 ) , true ( 1 ) }
               MAX-ACCESS              read-write
               STATUS                  current
               DESCRIPTION             "Represents the acknowledged status
                               for the NSP forwarded alarm of the managed object"

               ::=  {  nspAlarmsEntry  1016  }

       fwdVersion      OBJECT-TYPE
               SYNTAX                  OCTET STRING
               MAX-ACCESS              read-only
               STATUS                  current
              DESCRIPTION             "Current version of the NSP Forwarding SNMP
sub-agent"
               ::=  {  forwarding  10  }

       fwdStatus       OBJECT-TYPE
```

```
                SYNTAX                  INTEGER  { allGood ( 0 ) , failure ( 1 ) }

                MAX-ACCESS              read-only
                STATUS                  current
                DESCRIPTION             "Global state of the NSP Forwarding SNMP
sub-agent"
                ::=  {  forwarding  11  }

        ituAlarmEvent   OBJECT IDENTIFIER
                ::=  {  forwarding  733  }

        otherAlarm      NOTIFICATION-TYPE
                OBJECTS                 { nspAlarmId, nspManagedObjectId,
nspAlarmLastEventTime, nspAlarmProbableCause, nspAlarmPerceivedSeverity,
nspAlarmTrendIndication, nspAlarmThresholdLevel, nspAlarmObservedValue,
nspAlarmAdditionalText, nspAlarmSpecificProblem, nspAlarmFirstDate, nspAlarmClearDate,
 nspAlarmCriticalCount, nspAlarmMajorCount, nspAlarmMinorCount, nspAlarmWarningCount,
 nspAlarmAcknowledged, nspManagedObjectName, nspManagedObjectDN }

                STATUS                  current
               DESCRIPTION             "Represents the event type for other alarms
 as per [X.721],[X.733] and [X.736]"
                ::=  {  ituAlarmEvent  1  }

        communicationAlarm      NOTIFICATION-TYPE
                OBJECTS                 { nspAlarmId, nspManagedObjectId,
nspAlarmLastEventTime, nspAlarmProbableCause, nspAlarmPerceivedSeverity,
nspAlarmTrendIndication, nspAlarmThresholdLevel, nspAlarmObservedValue,
nspAlarmAdditionalText, nspAlarmSpecificProblem, nspAlarmFirstDate, nspAlarmClearDate,
 nspAlarmCriticalCount, nspAlarmMajorCount, nspAlarmMinorCount, nspAlarmWarningCount,
 nspAlarmAcknowledged, nspManagedObjectName, nspManagedObjectDN }

                STATUS                  current
                DESCRIPTION             "Represents the event type for the
communication alarms as per [X.721],[X.733] and [X.736]"

                ::=  {  ituAlarmEvent  2  }

        environmentalAlarm      NOTIFICATION-TYPE
                OBJECTS                 { nspAlarmId, nspManagedObjectId,
nspAlarmLastEventTime, nspAlarmProbableCause, nspAlarmPerceivedSeverity,
nspAlarmTrendIndication, nspAlarmThresholdLevel, nspAlarmObservedValue,
nspAlarmAdditionalText, nspAlarmSpecificProblem, nspAlarmFirstDate, nspAlarmClearDate,
 nspAlarmCriticalCount, nspAlarmMajorCount, nspAlarmMinorCount, nspAlarmWarningCount,
 nspAlarmAcknowledged, nspManagedObjectName, nspManagedObjectDN }

                STATUS                  current
              DESCRIPTION             "Represents the event type for the environment
 alarms as per [X.721],[X.733] and [X.736]"

                ::=  {  ituAlarmEvent  3  }

        equipmentAlarm  NOTIFICATION-TYPE
                OBJECTS                 { nspAlarmId, nspManagedObjectId,
nspAlarmLastEventTime, nspAlarmProbableCause, nspAlarmPerceivedSeverity,
nspAlarmTrendIndication, nspAlarmThresholdLevel, nspAlarmObservedValue,
nspAlarmAdditionalText, nspAlarmSpecificProblem, nspAlarmFirstDate,
nspAlarmCriticalCount, nspAlarmMajorCount, nspAlarmMinorCount, nspAlarmWarningCount,
 nspAlarmAcknowledged, nspManagedObjectName, nspManagedObjectDN }

                STATUS                  current
               DESCRIPTION             "Represents the event type for the equipment
 alarms as per [X.721],[X.733] and [X.736]"

                ::=  {  ituAlarmEvent  4  }
        integrityViolation      NOTIFICATION-TYPE
                OBJECTS                 { nspAlarmId, nspManagedObjectId,
nspAlarmLastEventTime, nspAlarmProbableCause, nspAlarmPerceivedSeverity,
nspAlarmTrendIndication, nspAlarmThresholdLevel, nspAlarmObservedValue,
nspAlarmAdditionalText, nspAlarmSpecificProblem, nspAlarmFirstDate,
nspAlarmCriticalCount, nspAlarmMajorCount, nspAlarmMinorCount, nspAlarmWarningCount,
 nspAlarmAcknowledged, nspManagedObjectName, nspManagedObjectDN }

                STATUS                  current
               DESCRIPTION             "Represents the event type for the integrity
 violation as per [X.721],[X.733] and [X.736]"

                ::=  {  ituAlarmEvent  5  }

        processingErrorAlarm    NOTIFICATION-TYPE
                OBJECTS                 { nspAlarmId, nspManagedObjectId,
nspAlarmLastEventTime, nspAlarmProbableCause, nspAlarmPerceivedSeverity,
nspAlarmTrendIndication, nspAlarmThresholdLevel, nspAlarmObservedValue,
nspAlarmAdditionalText, nspAlarmSpecificProblem, nspAlarmFirstDate,
nspAlarmCriticalCount, nspAlarmMajorCount, nspAlarmMinorCount, nspAlarmWarningCount,
 nspAlarmAcknowledged, nspManagedObjectName, nspManagedObjectDN }

                STATUS                  current
              DESCRIPTION             "Represents the event type for the processing
 error alarms as per [X.721],[X.733] and [X.736]"

                ::=  {  ituAlarmEvent  10  }

        qualityOfServiceAlarm   NOTIFICATION-TYPE
                OBJECTS                 { nspAlarmId, nspManagedObjectId,
nspAlarmLastEventTime, nspAlarmProbableCause, nspAlarmPerceivedSeverity,
nspAlarmTrendIndication, nspAlarmThresholdLevel, nspAlarmObservedValue,
nspAlarmAdditionalText, nspAlarmSpecificProblem, nspAlarmFirstDate,
nspAlarmCriticalCount, nspAlarmMajorCount, nspAlarmMinorCount, nspAlarmWarningCount,
 nspAlarmAcknowledged, nspManagedObjectName, nspManagedObjectDN }

                STATUS                  current
                DESCRIPTION             "Represents the event type for the quality
 of service alarms as per [X.721],[X.733] and [X.736]"

                ::=  {  ituAlarmEvent  11  }

        ituAlarmEventGroup      NOTIFICATION-GROUP
                NOTIFICATIONS   { communicationAlarm, environmentalAlarm,
equipmentAlarm, integrityViolation, otherAlarm, processingErrorAlarm,
qualityOfServiceAlarm }

                STATUS                  current
                DESCRIPTION             "ITU alarm Event notifications"
                ::=  {  forwarding  500  }

        managedObject   OBJECT-GROUP
                OBJECTS                 { nspManagedObjectClassDescription,
nspManagedObjectClassId, nspManagedObjectClassIdRef, nspManagedObjectClassName,
nspManagedObjectClassRowStatus, nspManagedObjectId, nspManagedObjectIdRef,
nspManagedObjectName, nspManagedObjectParent, nspManagedObjectRowStatus,
nspManagedObjectDN }

                STATUS                  current
                DESCRIPTION             "Data related to NSP managed objects"
                ::=  {  forwarding  200  }

        alarm   OBJECT-GROUP
                OBJECTS                 { nspAlarmAcknowledged,
nspAlarmAdditionalText, nspAlarmClearDate, nspAlarmCriticalCount, nspAlarmFirstDate,
 nspAlarmId, nspAlarmLastEventTime, nspAlarmMajorCount, nspAlarmMinorCount,
nspAlarmObservedValue, nspAlarmPerceivedSeverity, nspAlarmProbableCause,
nspAlarmEventType, nspAlarmRowStatus, nspAlarmSpecificProblem, nspAlarmThresholdLevel,
 nspAlarmTrendIndication, nspAlarmWarningCount }

                STATUS                  current
                DESCRIPTION             "Data related to NSP alarms"
                ::=  {  forwarding  300  }

        forward OBJECT-GROUP
                OBJECTS                 {fwdVersion, fwdStatus}
                STATUS                  current
                DESCRIPTION             "Data related to NSP forwarding module"
                ::=  {  forwarding  100  }

END
```