User Guide

NQMSfiber

Network Quality Monitoring System

www.EXFO.com

Telecom Test and Measurement

EXPERTISE REACHING OUT

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Please be sure to include your mailing address and a check of CAD $35 to cover the cost of distribution.

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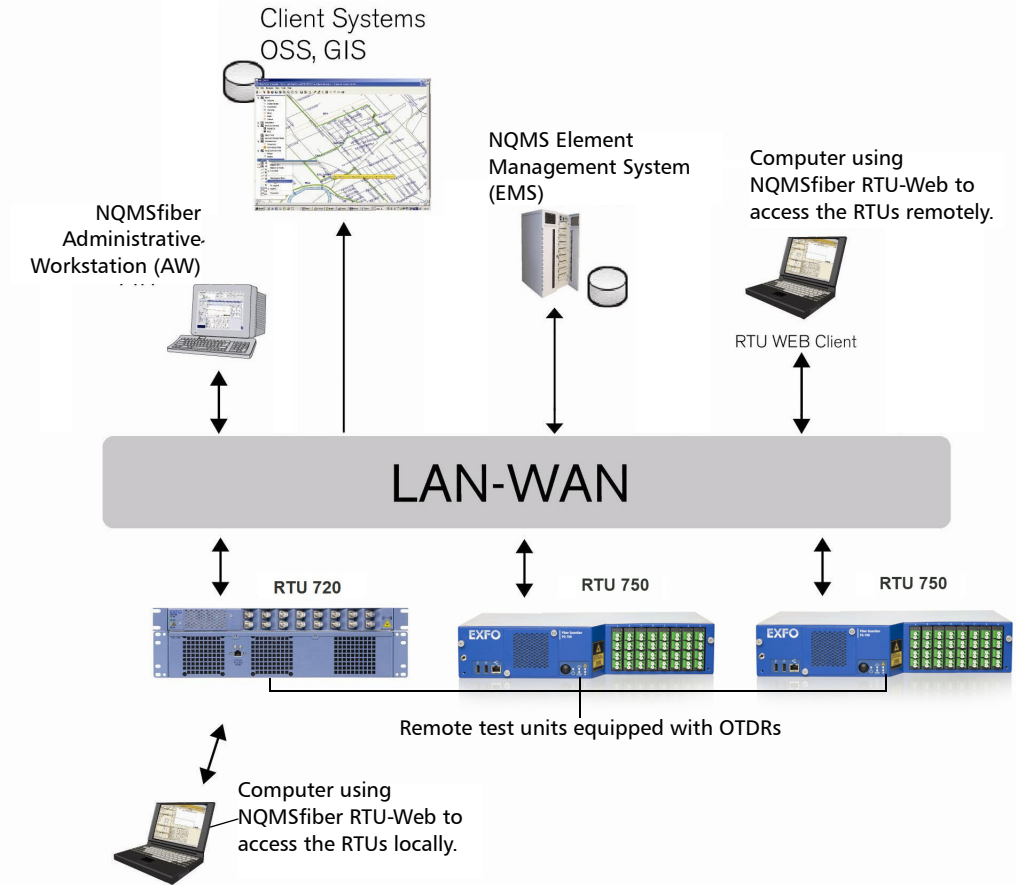
1 Introduction

A problem in your optical network is costly, and may affect your customers; maintaining optimal performance quality is therefore crucial.

NQMSfiber System Overview

The NQMS*fiber* Network Quality Monitoring System is a remote fiber testing system that allows you to pinpoint events as soon as they occur. It has been designed to manage optical fiber networks of any size or configuration.

The diagram below illustrates the overall system architecture.



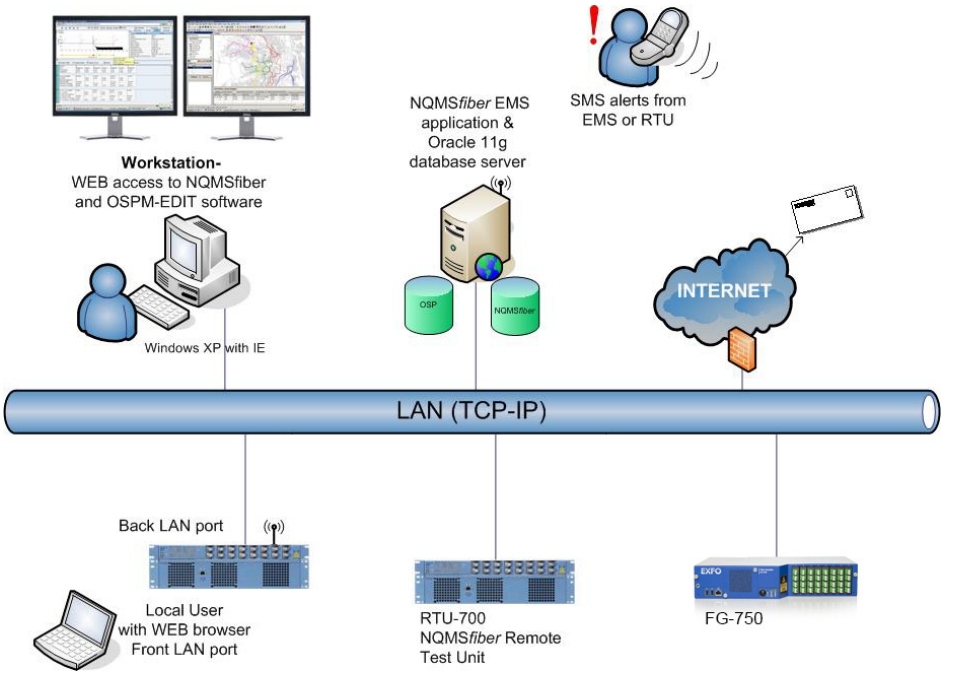
The table below gives you more information about the main components of the system.

Component	Description
Element Management System (EMS)	Central server of the system that sends the configuration data (including test setups) to the RTUs, and collects the test results. The EMS also manages the communication between the RTUs and remote users located anywhere in the field.
Remote Test Unit (RTU)	Device, placed at a strategic location, that directly controls the measurements. The RTUs comprise ➤ controller that receives instructions from the EMS on how and when to perform OTDR tests. It returns test results to the EMS. ➤ an optical switching sub-system, either fixed port or expandable (FG-750EX only), with cassettes (OSCs). ➤ an Optical Time Domain Reflectometer (OTDR) to identify faults and events. You can establish multiple optical routes by using dedicated dark fibers or a mix of dark and live fibers. A dark fiber is a spare fiber that is not used for transmission, while a live fiber is currently used for transmission.
Administrative Workstation (AW)	It is a part of the EMS application and does not require any specific software. It represents the NQMSfiber user interface, providing administrative and operational access to the applications.

Working with OSPInSight

The Geographic Information System (GIS) is known as **OSPInSight**. This solution is based on MapInfo GIS software and can be used to capture NQMSfiber events and locate faults on geo-referenced maps. Apart from these, the additional layers, such as ducts and conduits, aerial and terrestrial cables, as well as buildings can be shown based on their GPS coordinates and geo-properties.

The OSPInSight block diagram is shown below.

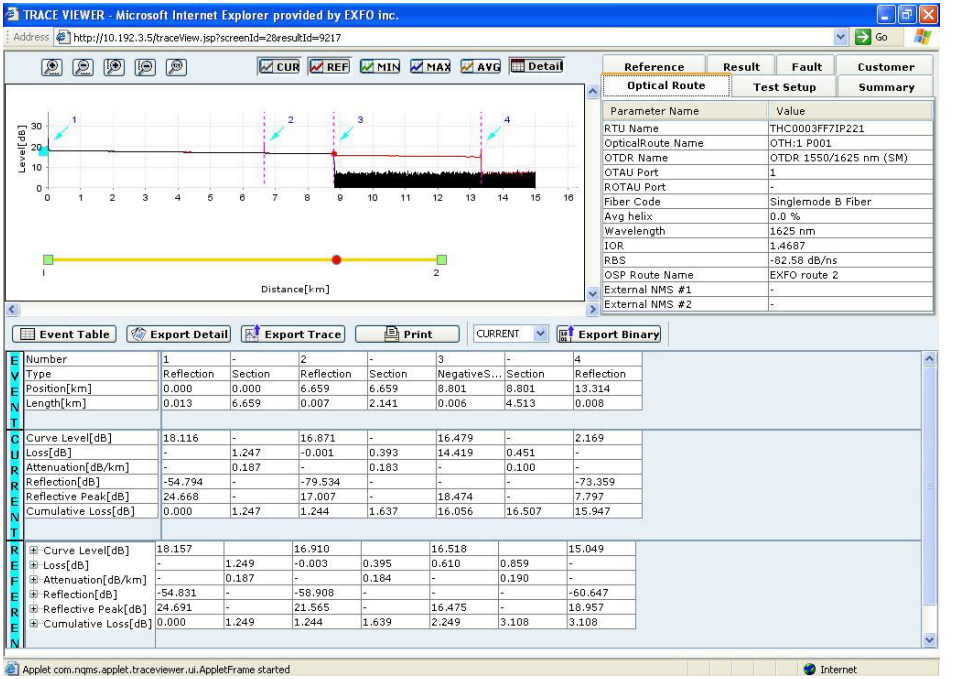


The EMS application with OSPInSight configuration is the one where the you can view the exact location of the fiber fault. Where as in EMS application without OSPInSight configuration, you can locate the fault on the entire route on a schematic topology built-in the EMS User Interface.

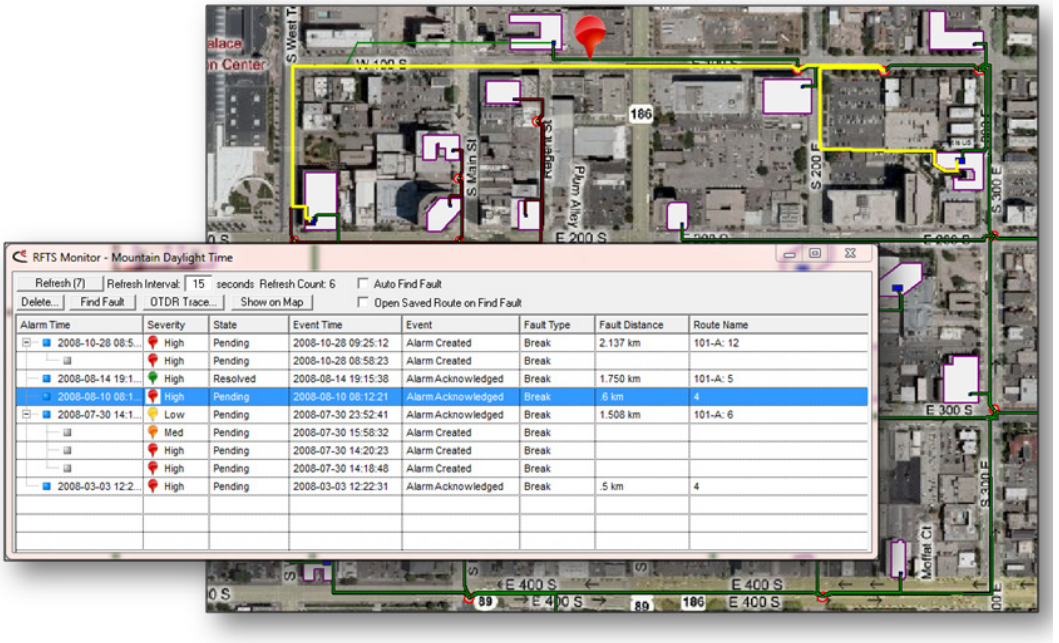
Features of GIS Integration

The GIS integration provides the features listed below.

- Segment route and associate customer to one or multiple segments.
- View fault on the GIS route (linear view) as shown below.



➤ NQMSfiber is certified for operation with a third-party network management software called OSPInSight from AFO Inc. The fault view on OSPInSight is shown below.



Main Features of NQMSfiber

The NQMSfiber system offers many features such as:

- Monitoring of optical routes and its system components (for maintenance purposes).
- Alarm management: When measurements exceed the thresholds that you have established, faults are generated by the RTUs and alarms are generated by the EMS. Notifications can be sent to specific users. These notifications are sent through mobile phones, or electronic mails.
- Report Dashboard: Create MTTR, availability, TTR distribution, and fault distribution KPI type of reports to analyze trends, areas of concern, and overall FO network and maintenance team performance in repairing issues detected and reported by the system as alarms.
- Possibility to define users and user groups.
- Possibility to define access rights for specific users or groups.
- Tools to help you generate reports based on various data sources.
- Test on demand: Test on demand refers to the immediate execution of a test setup on the RTU. You can initiate a test on demand as and when required. You can view all the tests on demand performed on a particular RTU by all the users. The results for the test on demand are displayed on the system through the RTU's.
- Duty scheduler to manage different shifts/resources management.
- Possibility to create schematic view of different sites under different regions and associated routes.
- Possibility to configure user defined alarms and assign priorities.
- Possibility to configure graphical reports using widgets to analyze the performance of customers, regions, RTUs, or optical routes in the network, and to take corrective actions when required.

- Possibility to view NQMS alarms and perform some key actions on the EMS from a smart phone.
- Possibility to manage user communication with different RTUs in the field.
- Possibility to apply software patches or builds on RTU remotely.
- Possibility to integrate with GIS systems on Web/SNMP.
- The application can run on Linux and Windows.

Conventions

Before using the product described in this guide, you should understand the following conventions:

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in *death or serious injury*. Do not proceed unless you understand and meet the required conditions.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in *minor or moderate injury*. Do not proceed unless you understand and meet the required conditions.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in *component damage*. Do not proceed unless you understand and meet the required conditions.

IMPORTANT

Refers to information about this product you should not overlook.

2 Getting Started with NQMSfiber

The chapter provides information on starting NQMSfiber, as well as navigating the user interface.

Logging on to NQMSfiber

It is typically the system administrator who specifies the login names and passwords for the users when creating them. All the procedures and information presented in this user guide are intended for a user that has administrator rights.

To reach an EMS application over the internet, you should enter the EMS URL that is www.nqmsfiber.com on Internet Explorer, where the nqmsfiber is the host name on which the EMS application is hosted.

To reach an EMS application over the LAN, you should enter the IP address and the port number where the EMS application is running. For example, https://10.192.2.25:8443, where 10.192.2.25 is the IPv4 address and 8443 is the port. This url could be IPv4 or IPv6 e.g. https://[2010::13]:8443. You can create a link on this browser to server IP address, to make the access easier and faster.

The EMS application can only be accessed on a secured connection. All the data, including user names and passwords are sent in an encrypted form. This ensures data security while accessing the application.

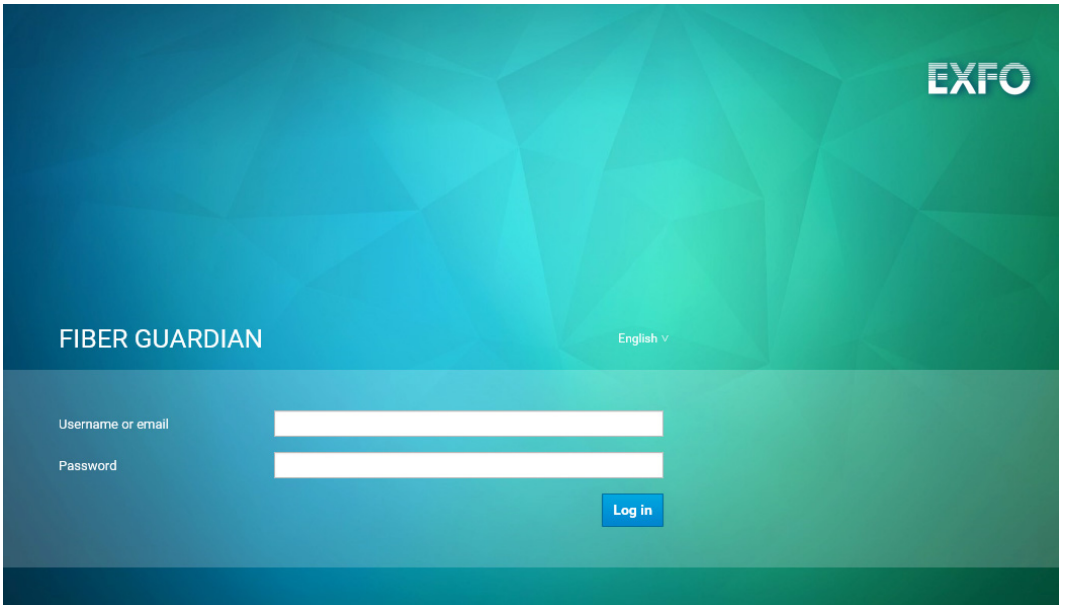
Note: *To ensure that all the windows display correctly on the AW workstations, Java Runtime Environment version 1.7 or 1.8 must be installed on each of them. If the Java Runtime Environment version 1.7 or 1.8 is not downloading automatically from EMS, you can install this framework from the Java website. Otherwise, windows such as Topology view and Alarm summary will not be displayed at all. Contact your network administrator.*

To log on to NQMSfiber:

Before Logging on to the system, ensure that the EXFO technical support has created an Administrator account with the proper access rights to create NQMSfiber users.

1. Double-click the icon located on the desktop.

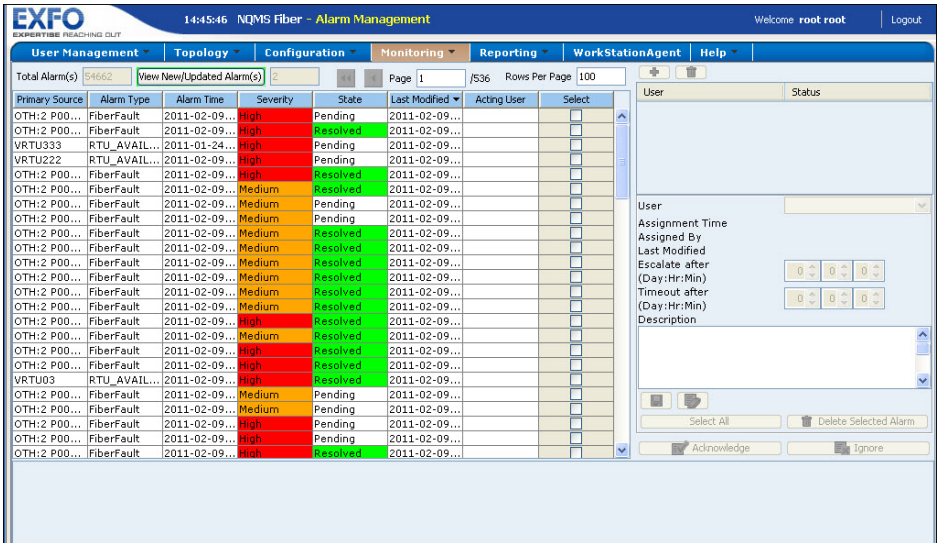
   The **NQMSfiber Login** screen is displayed.



2. Enter your **Login Name** and **Password**.

3. Click **Login** or **Reset** to clear all the fields.

   After successful login, the NQMSfiber alarm monitoring view is displayed.

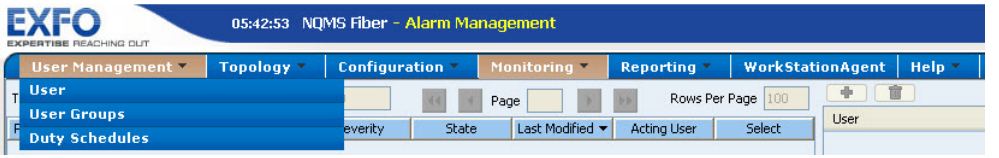


Note: *When the application is used for the first time then License module screen is displayed.*

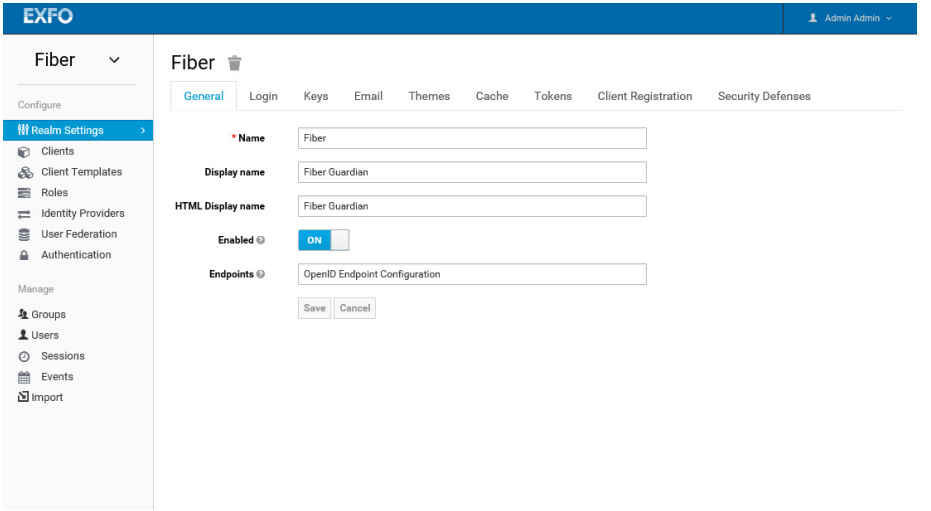
By default session time out for EMS application is 15 min so after every 15 min ideal time session will be expired, this is called as session **time-out delay**. If you select to open topology applet (root or a region) which never expires session. Topology application will be running continuously.

Using the Menus

The NQMSfiber has a menu structure that enables you to access the functions of the system.



The above figure displays the default menu bar. The below figure shows an example of the limited number of menus that you can view.



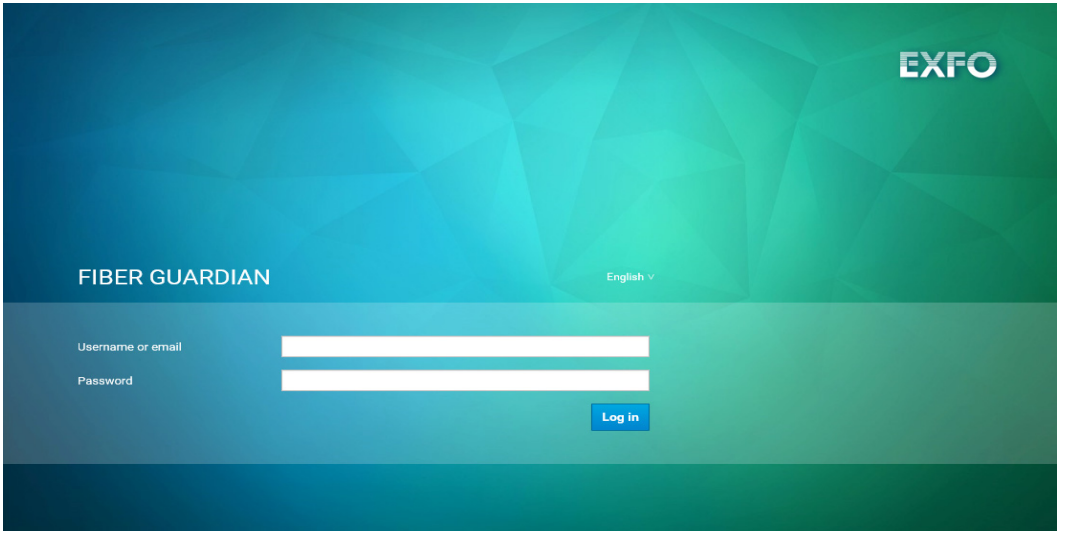
3 User Management

Introduction

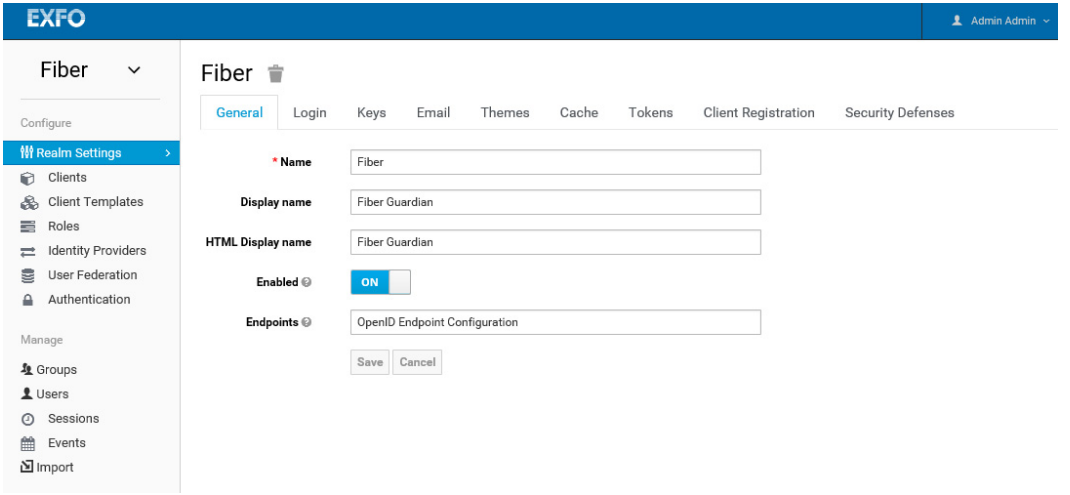
The Fiber console module is an open-source enterprise-class Identity and Access Management (IAM) solution which EXFO has customized and integrated to its Fiber Guardian/NQMSfiber products. It offers simple, secured, and extensive authentication and auditing functions. As a user in a centrally managed installation, you are now authenticated through a single sign-on/out instance which can itself be connected to your existing LDAP (Lightweight Directory Access Protocol) service. For centrally managed solutions, it means one log-on to move from one application (e.g. central) to another (e.g. local).

Logging in to the Administration Console

1. Go to the welcome page of the console URL at https://IAM_Server_IPaddress:8443/auth.
2. To access the console, use the **Users** menu item in the navigation bar once logged in.



3. Enter your **Username or email** and **Password**. The user Admin Console page opens.



Note: *If you are curious about a certain feature, button, or field within the Admin Console, hover your mouse over the question mark ? icon. This will pop up tooltip text to describe the area of the console you are interested in.*

Realm Settings

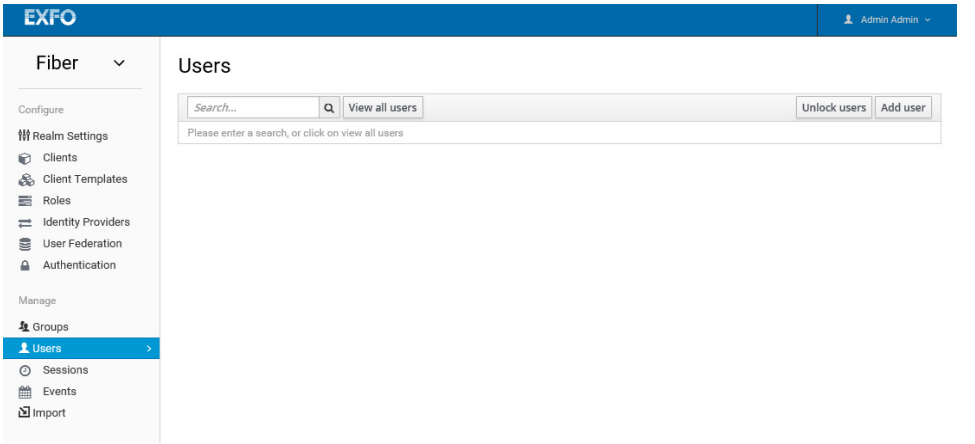
A realm manages a set of users, credentials, roles, and groups. A user belongs to and logs into a default realm named **fiber**, display name **Fiber Guardian Management System**. Realms are isolated from one another and can only manage and authenticate the users that they control. For all standard installs, only one Realm is to be used.

Roles

Roles are configured at the Realm level and identify a type or category of user. Admin, user, manager, and employee are all typical roles that may exist in an organization. For example, the Admin Console has specific roles which give permission to users to access parts of the Admin Console UI and perform certain actions. There is a global namespace for roles and each user also has its own dedicated namespace where roles can be defined.

Managing Users

If you need to manage a specific user, click on **Users** in the left menu bar. This menu option brings you to the user list page.



To search for users:

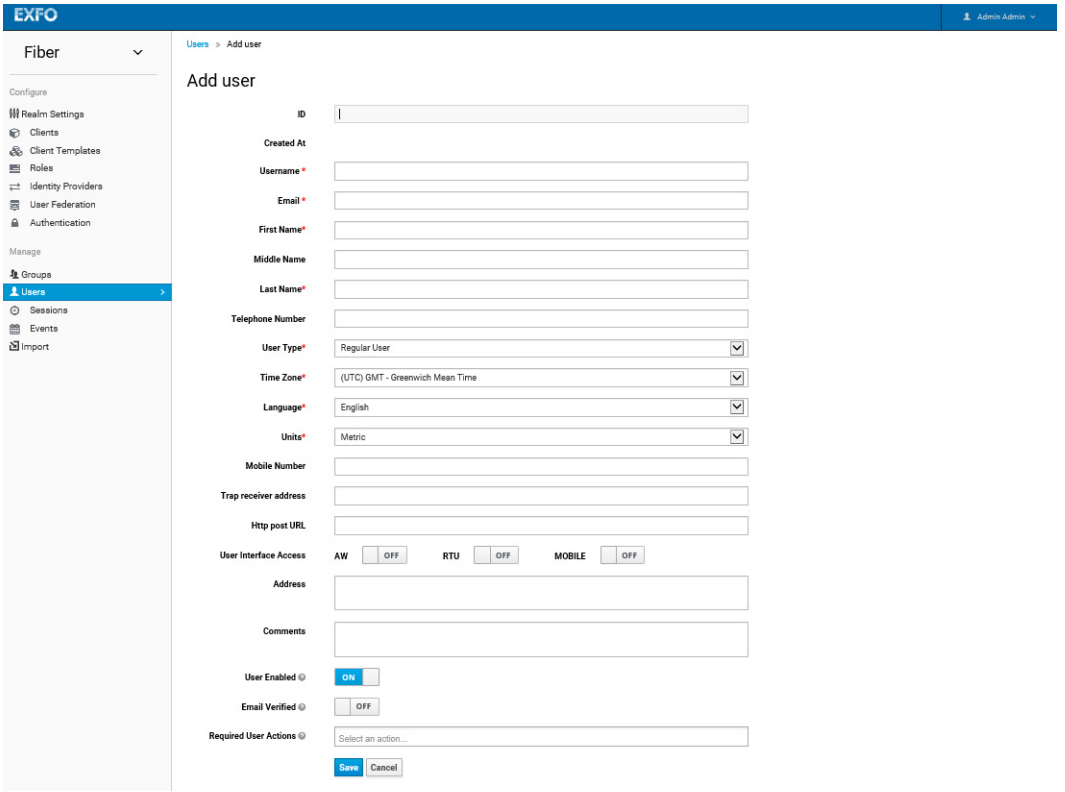
1. In the search box, type in a full name, last name, or email address you want to search for in the user database. The query will bring up all users that match your criteria. The **View all users** button will list every user in the system. This will search just the local user database and not the federated database (LDAP) because some LDAP does not have a way to page through users.
2. So if you want the users from federated backend to be synced into the user database you need to either:

   2a. Adjust search criteria. That will sync just the backend users matching the criteria into the user database.

   2b. Go to **User Federation** tab and click **Sync all users** or **Sync changed users** in the page with your federation provider. See *User Federation* on page 27 for more details.

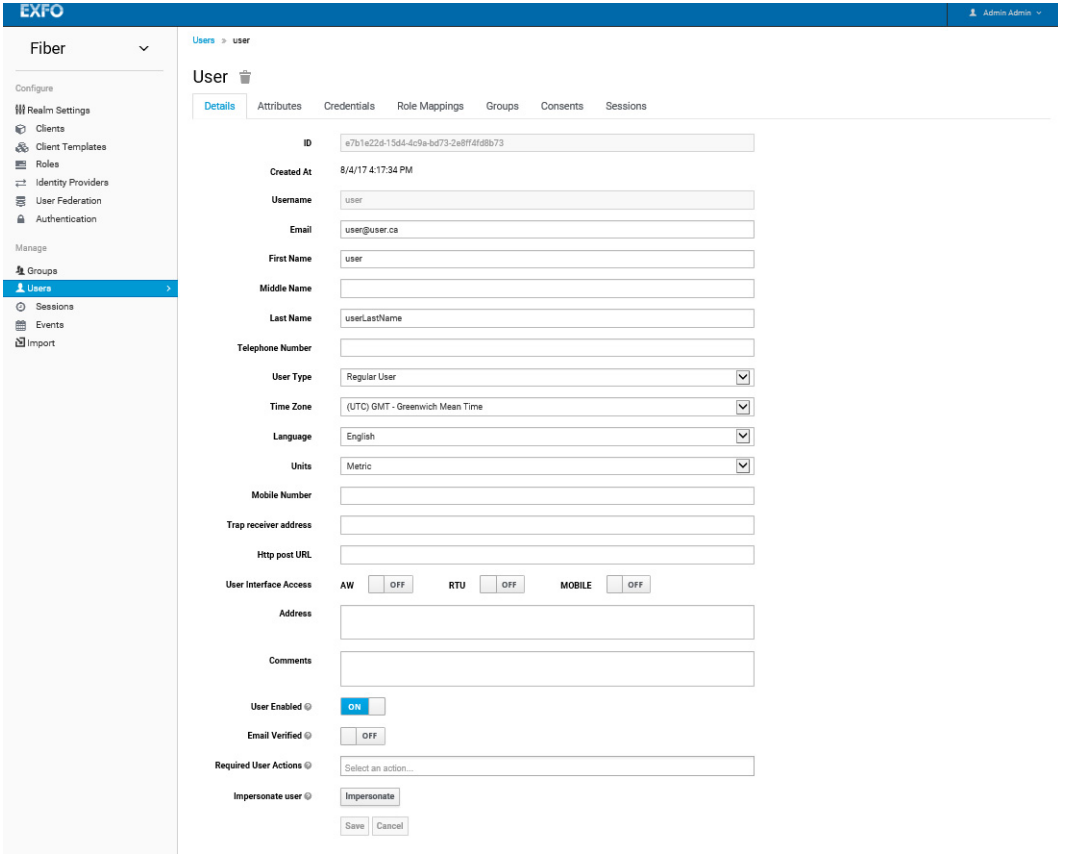
To create new users:

1. From the user list page, on the right side of the empty user list, click the **Add User** button to start creating your new user.



2. Enter the mandatory fields highlighted with an asterisk.

3. Click **Save**. This will bring you to the management page for your new user.



The user management page allows you to manage and view user information, by selecting the desired tab.

- The **Details** tab displays all the data relevant to the user, including the following:
  - **User Type** is either **Regular User** or **Customer**.

    Regular User refers to a person who uses the system to provide Quality of Service (QoS) data for the customer. Regular users do not receive alerts according to the fault position, as they are not associated with the optical route sections. However, they receive alerts for each alarm defined in the alarm type.

    Customer refers to an individual, a partner, an association, a joint stock company, a trust, a corporation, or a governmental entity that subscribes to telecommunications services offered by the company operating the NQMSfiber system.

    Customers are different from regular users because they cannot access the system (neither EMS nor RTU) through the administrative workstation (AW) but can receive alerts and automatically generated reports through emails. However, they are mostly interested in faults that occur on the sections of an optical route that belong to them. Thus, different customers can be defined for different sections of each optical route.

Note: *If you are not part of a region in which the RTU is located, you will not see the alarms coming from that RTU as well as the status and the results associated. You will not be able to access that RTU and change its configurations.*

  - **Time Zone** is the preferred time zone used to display the date and time in the AW windows.
  - **Language** is the preferred language for the user interface:

    English, French, Spanish, or Russian.

- **Units** can be either **Metric** or **Imperial**.
- **Mobile Number** is the number of the user's mobile device.
- **Trap receiver address** is for the RTU (remote test unit) only. The default is the manager IP address/DNS name of the SNMP manager. You can change the value when you configure a user. For existing users, this value is configured under Configuration > Host > Northbound Settings > SNMP. Provide the HTTP post URL where the JSON (JavaScript Object Notation) object for an event will be posted if the HTTP post notification channel is configured.
- **HTTP post URL**: Parameters in a post are either in the body (default) or directly in the string. You can also have parameters in the string like this: https://example.com/page?parameter=value&also=another.

  Include the names of the desired fields with a $ in front. For example, https://example.com/page?param1=$FaultGroupDate&param2=$Position. In this example, the values of FaultGroupDate and Position would go in param1 and param2.

  Available values are as follows (case insensitive):

  FaultIdOnRtu, FaultResultIdonRTU, FirstReferenceIdonRTU, LastLearningIdonRTU, FaultType, Confirmations, Position, MinPosition, MaxPosition, Loss, ThresholdType, ThresholdValue, AppliedThreshold, EventType, OpticalRoute, TestSetupId, TestSetupName, TestType, RTUName, RTUIP and OTDRSerialNumber.

- **User Interface Access** allows you to select **ON** or **OFF** for the following:

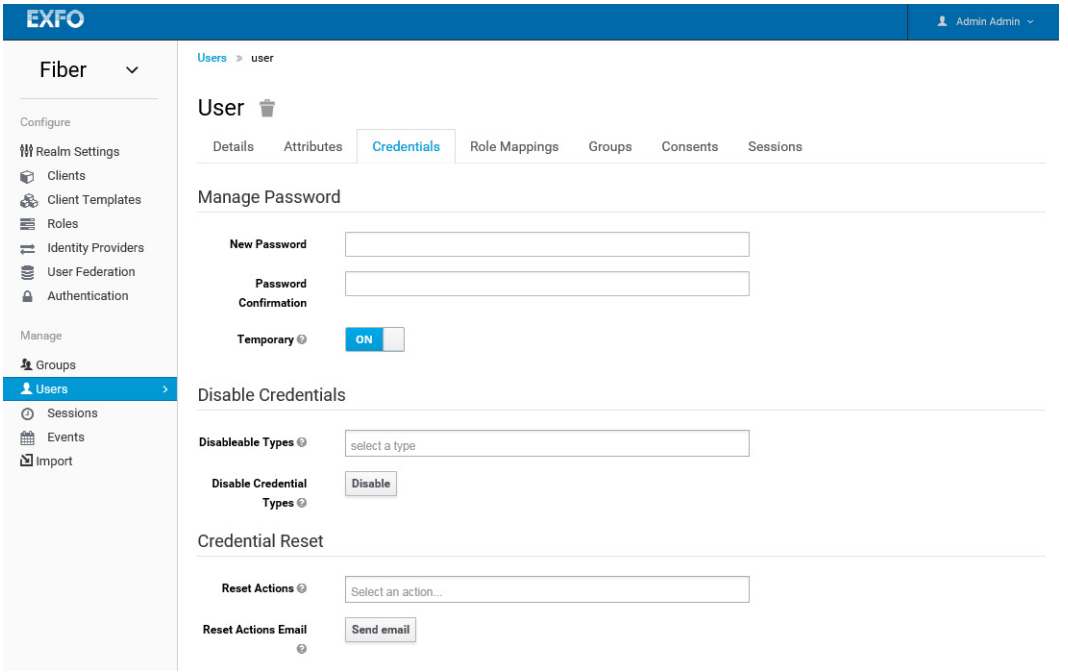
  AW (administrative workstation) which is required to view the EMS web interface.

  RTU (remote test unit) for access from the EMS.

  MOBILE for mobile app access.

- **User Righ°C or °Fts for RTU** is **View** or **Edit**, allowing you to grant viewing or editing rights for the RTU application.

- **Credentials** are pieces of data that are used to verify the identity of a user. Examples are passwords, OTP (one-time-passwords), digital certificates, or even fingerprints. This tab allows you to create, disable, and reset passwords.



To change a password:

1. Enter a new one. A **Reset Password** button will pop up that you click, after you've typed everything in. If the **Temporary** switch is **ON**, this new password can only be used once and will need to be changed after login.
2. Alternatively, if you have email set up in **Realm Settings**, you can send an email to the user that asks them to reset their password. Choose **Update Password** from the **Reset Actions** list box and click **Send email**. The sent email contains a link that will bring the user to the update-password screen.
3. Like passwords, you can send an email to the user that asks them to reset their OTP (one-time password) generator. Choose **Configure OTP** in the **Reset Actions** list box and click the **Send email** button. The sent email contains a link that will bring the user to the OTP setup screen.

Required Actions

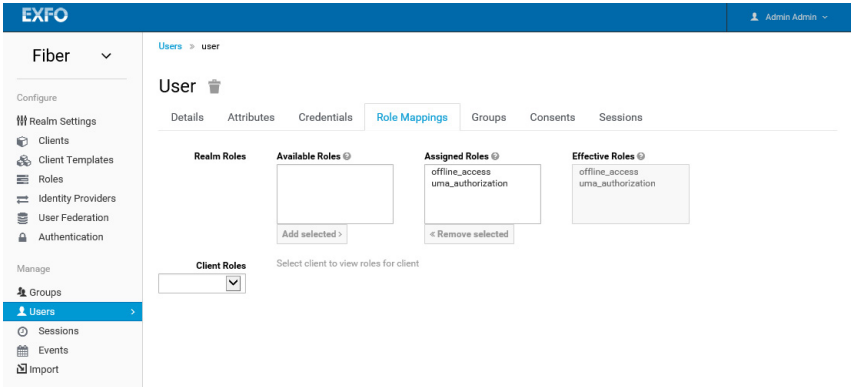
Required Actions are tasks that a user must finish before they are allowed to log in. A user must provide their credentials before required actions are executed. Once a required action is completed, the user will not have to perform the action again. Here are explanations of some of the built-in required action types:

- **Update Password**: When set, a user must change their password.
- **Configure OTP**: When set, a user must configure a one-time password generator on their mobile device using either the Free OTP or Google Authenticator application.

- **Verify Email**: When set, a user must verify that they have a valid email account. An email will be sent to the user with a link they have to click. Once this workflow is successfully completed, they will be allowed to log in.
- **Update Profile**: This required action asks the user to update their profile information, i.e. their name, address, email, and/or phone number.

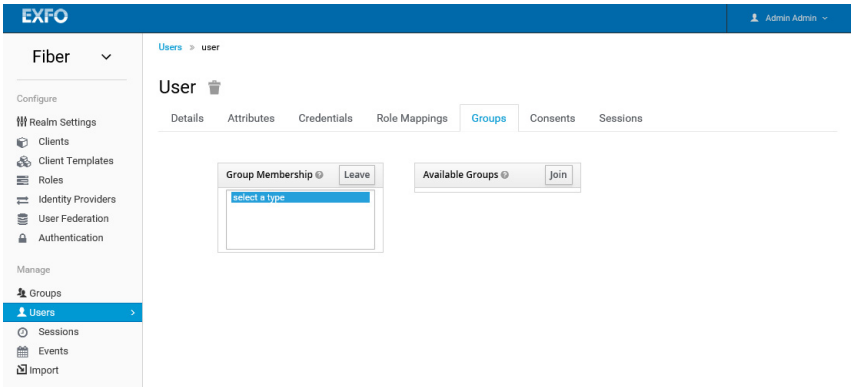
Admins can add required actions for each individual user within the user's **Details** tab in the Admin Console.

- User **Role Mappings** can be assigned individually to each user and defines a mapping between a role and a user. A user can be associated with zero or more roles. This role mapping information can be encapsulated into tokens and assertions so that applications can decide access permissions on various resources they manage.



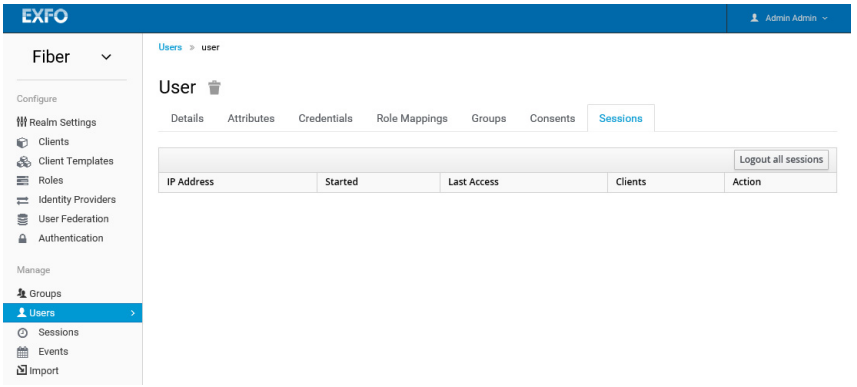
Roles are configured at the Realm level. For more information, see *Roles* on page 4.

➤ **Groups** manage groups of users. Attributes can be defined for a group. You can map roles to a group as well. Users that become members of a group inherit the attributes and role mappings that group defines.



Select a group from the **Available Groups** tree and click the **Join** button to add the user to a group. Vice versa to remove a group. If you go to **Groups** and the detail page for that group, and select the **Members** tab, the user list has been updated.

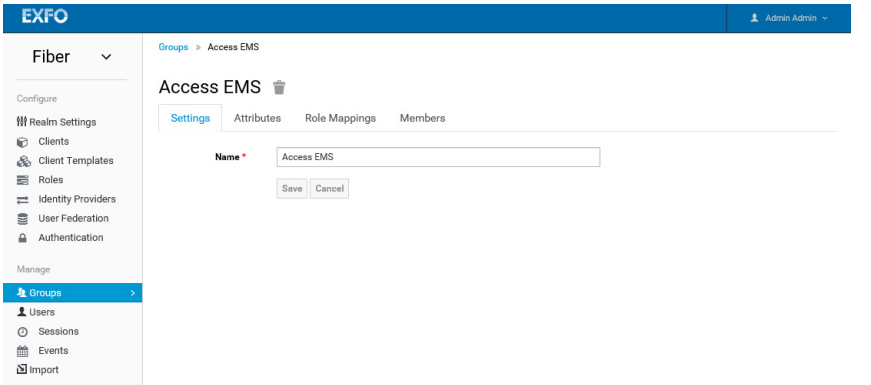
➤ **Sessions** are created when a user logs in. A session manages the login session and contains information like when the user logged in and what applications have participated within single-sign on during that session. Both admins and users can view session information.



Managing Groups

Groups allow you to manage a common set of attributes and role mappings for a set of users. Users can be members of zero or more groups. Users inherit the attributes and role mappings assigned to each group. To manage groups go to the Groups left menu item.

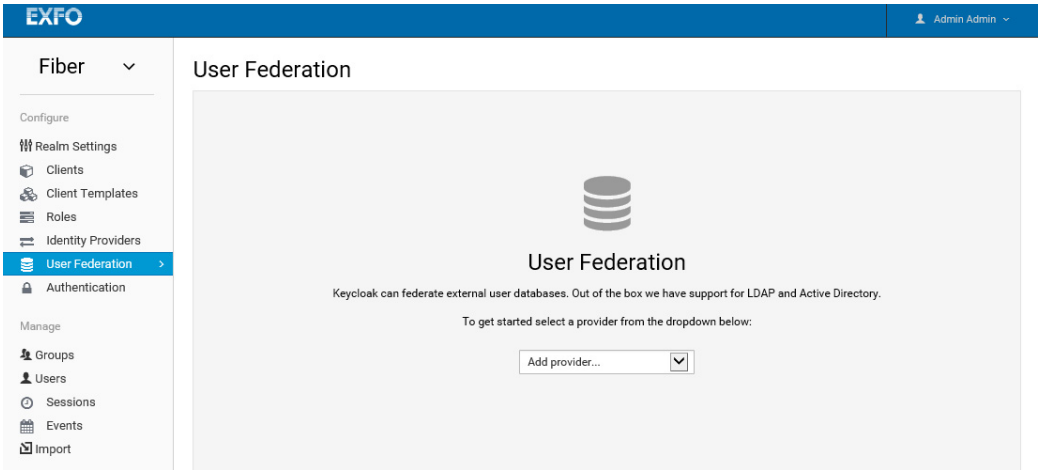
Groups are hierarchical. A group can have many subgroups, but a group can only have one parent. Subgroups inherit the attributes and role mappings from the parent. This applies to the user as well. So, if you have a parent group and a child group and a user that only belongs to the child group, the user inherits the attributes and role mappings of both the parent and child. To add a group, click on the parent you want to add a new child to and click **New** button. Select the Groups icon in the tree to make a top-level group. Entering in a group name in the **Create group** screen and hitting **Save** will bring you to the individual group management page.



Any attributes and role mappings you define will be inherited by the groups and users that are members of this group. To add a user to a group you need to go back to the user detail page and click on the **Groups** tab there. For more information, see page 24.

User Federation

Users can federate existing external user databases with support for LDAP and Active Directory by using the User Storage SPI. Once you log in, the internal user store searches to find you. If you can not be found, an iteration over every User Storage provider configured for the realm will be performed until a match is found. Data from the external store is mapped into a common user model that is consumed by the runtime. This common user model can then be mapped to OIDC token claims and SAML assertion attributes.



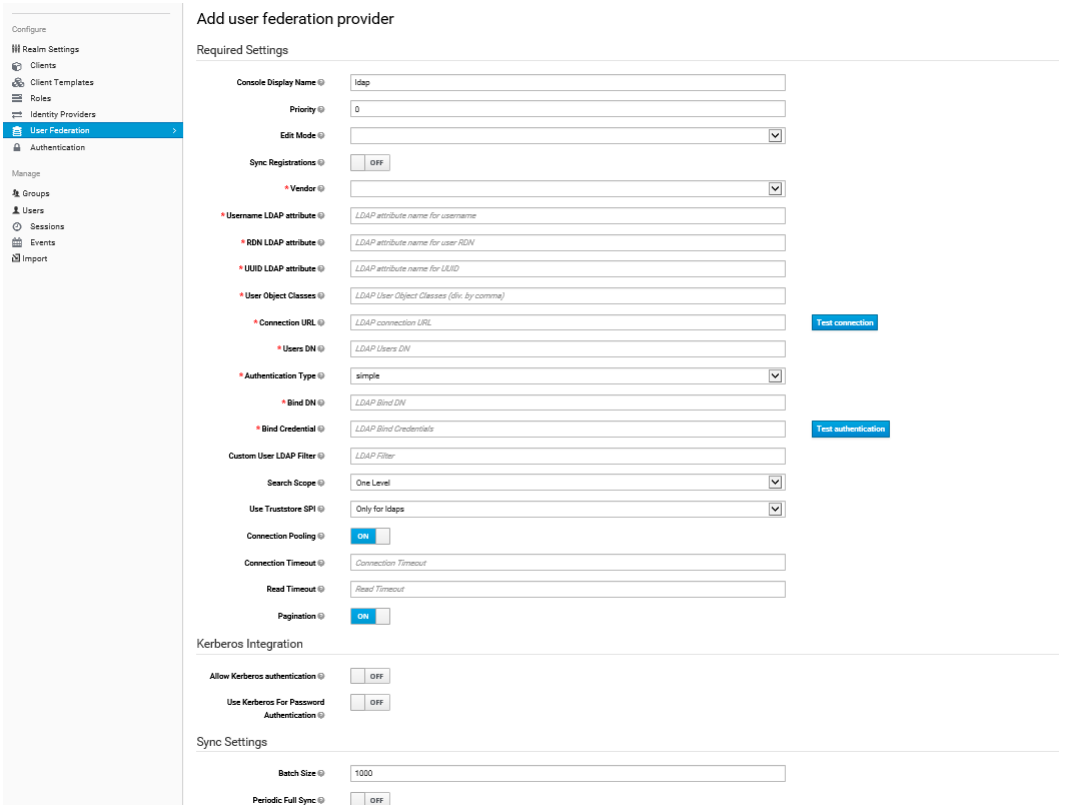
To add a storage provider:

1. Click on **User Federation** in the left menu of the Admin Console.
2. Click in the **Add provider...** list box and choose the desired provider. The configuration page of that provider will open.

LDAP and Active Directory

The user management console comes with a built-in LDAP/AD provider. It is possible to federate multiple different LDAP servers in the same user realm where you can map LDAP user attributes into the common user model. By default, it maps username, email, first name, and last name, but you are free to configure additional mappings. The LDAP provider also supports password validation via LDAP/AD protocols and different storage, edit, and synchronization modes.

Selecting **ldap** as the desired provider from the **User Federation** page will bring you to the LDAP configuration page.



Configuring LDAP Settings

- **Console Display Name** is used when this provider is referenced in the admin console.
- **Priority** denotes the priority of this provider when looking up users or for adding registrations.
- **Edit Mode** allows users, through the User Account Service, and admins, through the Admin Console, to have the ability to modify user metadata. Depending on your setup you may or may not have LDAP update privileges. The Edit Mode configuration option defines the edit policy you have with User Documentation LDAP/AD Integration 314 your LDAP store.
  - **READ_ONLY** does not allow changes to username, email, first name, last name, and other mapped attributes. An error will be displayed anytime anybody tries to update these fields. Also, password updates will not be supported.
  - **WRITABLE** allows for updates to username, email, first name, last name, other mapped attributes and passwords. All will be synchronized automatically with your LDAP store.
  - **UNSYNCED** allows any changes to username, email, first name, last name, and passwords to be stored in the user local storage. It is up to you to figure out how to synchronize back to LDAP. This allows user deployments to support updates of user metadata on a read-only LDAP server. This option only applies when you are importing users from LDAP into the local user database.
- **Sync Registrations** enables/disables your LDAP adding new users. Click **ON** if you want new users created in the admin console or the registration page to be added to LDAP.
- **Allow Kerberos authentication** allows you to select **ON**/**OFF** for Kerberos/SPNEGO authentication in realm with users data provisioned from LDAP.

- **Sync Settings** allows you to sync all LDAP users into the user database, by configuring and enabling the following settings:
  - **Batch Size** is the number of LDAP users to be imported from LDAP in a single transaction.
  - **Periodic Full Sync** will synchronize all LDAP users when **ON** is selected. Those LDAP users, which already exist and were changed in LDAP directly will be updated.
  - **Periodic Changed Users Sync** will update and/or import only those users that were created or updated after the last sync, when **ON** is selected.

Storage Mode

By default, users from LDAP will be imported into the local user database. This copy of the user is either synchronized on demand, or through a periodic background task. The one exception to this is passwords. They are not imported and password validation is delegated to the LDAP server. The benefits to this approach is that all features will work, while any extra per-user data that is needed can be stored locally. This approach also reduces load on the LDAP server as uncached users are loaded from the user database the second time they are accessed. The only load your LDAP server will have is password validation. The downside to is that when a user is first queried, this will require a user database insert. The import will also have to be synchronized with your LDAP server as needed.

Alternatively, you can choose not to import users into the user database. In this case, the common user model that the runtime uses is backed only by the LDAP server. This means that if LDAP doesn't support a piece of data that a feature needs, that feature will not work. The benefit to this approach is that there is no overhead of importing and synchronizing a copy of the LDAP user into the user database.

4 Configuring NQMSfiber

This chapter provides information on configuring the NQMSfiber system components.

Defining System Setting Parameters

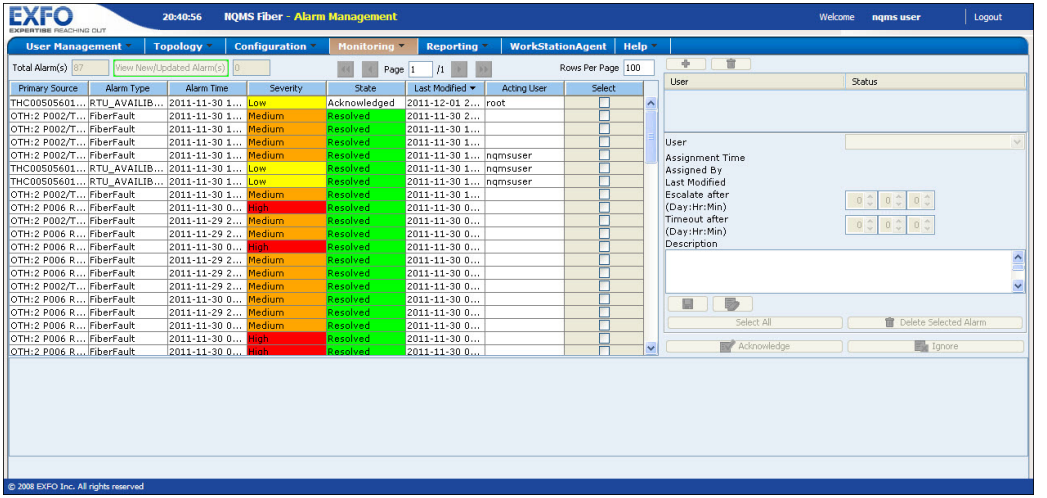
By default, the system parameters are first set during installation. However, you can configure these default settings to meet your requirements.

Note: *You cannot modify the factory default values.*

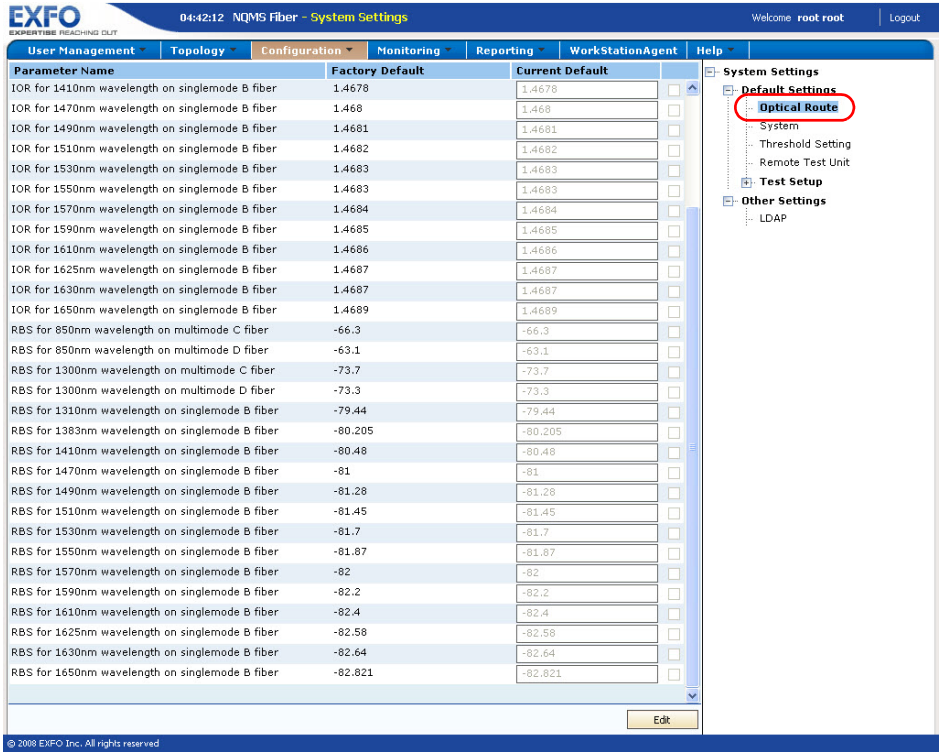
Note: *If the default Settings in the EMS application are changed, the factory defaults on the RTU will also be updated automatically.*

To configure the optical route parameters:

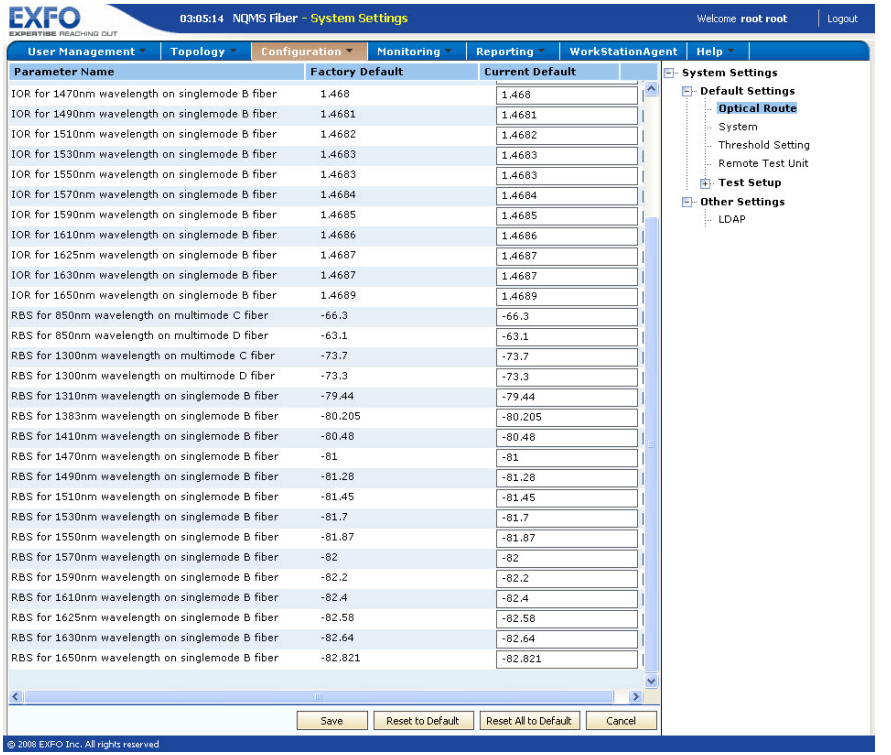
1. From the **Configuration** menu, select **System Settings**.



2. From the **System Settings** list, click **Optical Route**.



3. Click **Edit** to modify the current settings.



4. Modify any of the following parameters:

➤ **Average helix factor (%)**: The helix factor considers the difference between the length of the cable and the length of the fiber inside the cable. Every cable has multiple fibers. The fibers within a cable spiral around the cable core. The helix factor describes the pitch of that spiral. By setting the helix factor, the length of the RTU trace distance axis is always equivalent to the physical length of the cable (not the fiber).

- **IOR**: The Index of Refraction (IOR) value is also known as group index and is used to convert the Time of flight to distance. It is crucial to have proper IOR for all RTU measurements associated with distance (event position, attenuation, section length, total length, and so on). The IOR is provided by cable or fiber manufacturer.
- **RBS**: The Rayleigh Backscatter coefficient represents the amount of backscatter in a particular fiber. The RBS coefficient is used to calculate event loss and reflectance and can be obtained from cable manufacturer.

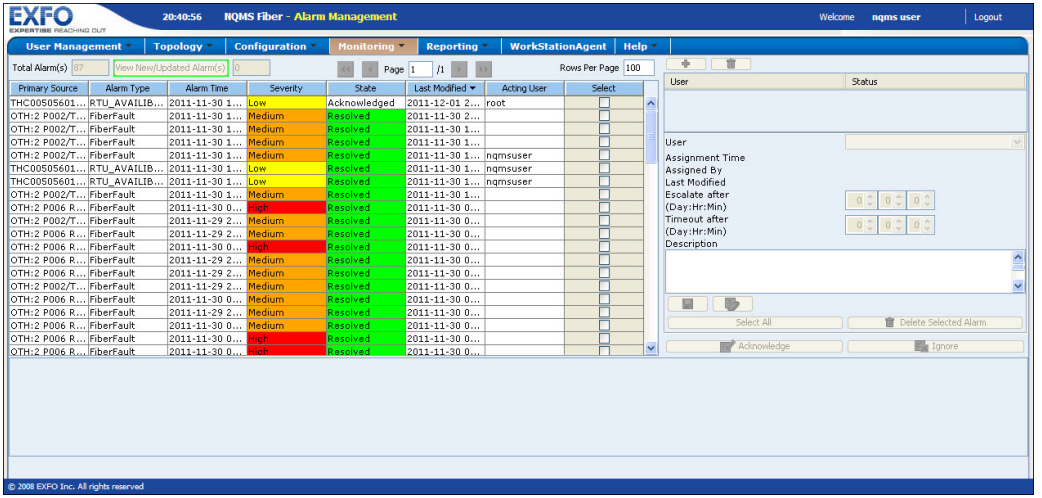
5. Click **Save** to apply your changes, or **Cancel** to discard them.

Note: *If the parameters are modified, for example, changing the IOR for 1550 nm, RBS, and Average helix will send this value to the RTU when a new route is created using the* ***Detect Fiber*** *function.*

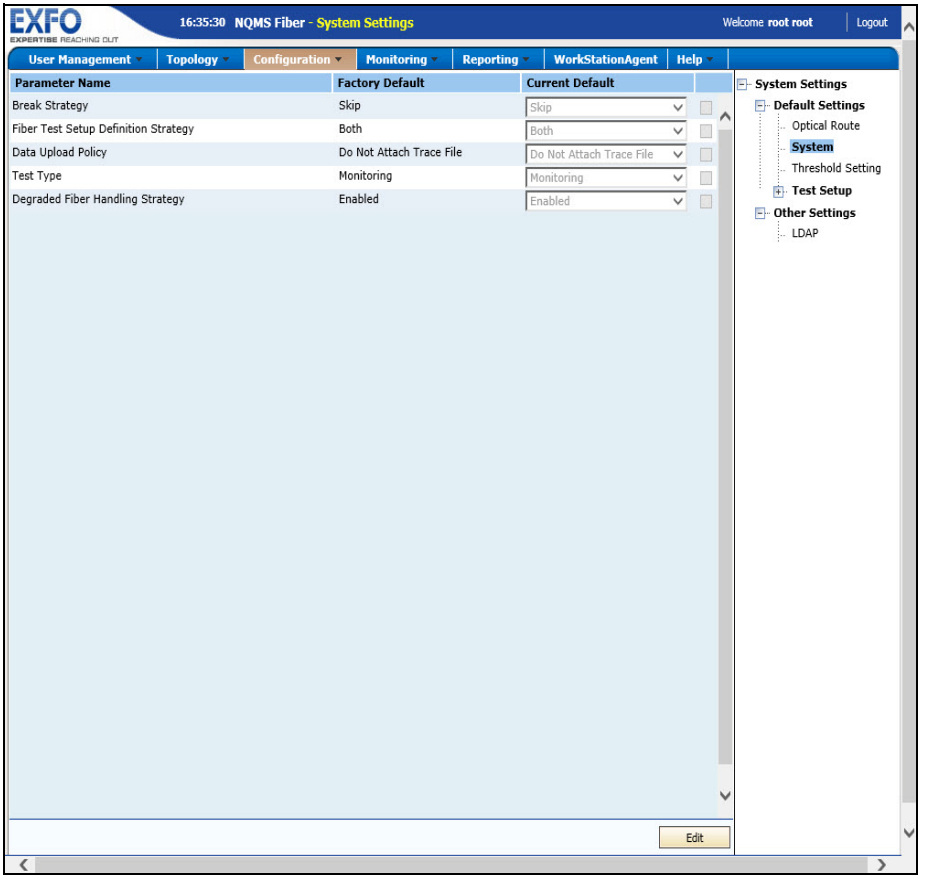
Note: *To revert a parameter to its default value, select the corresponding check box and click* ***Reset to Default****. To reset all the parameters, click* ***Reset All to Default****.*

To configure the system settings:

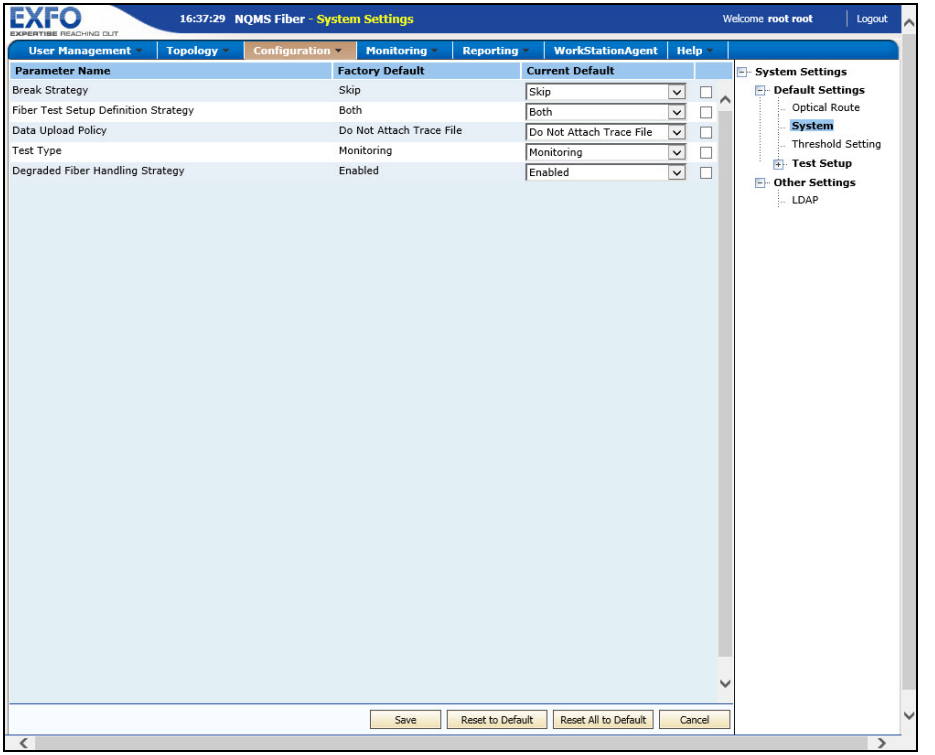
1. From the **Configuration** menu, select **System Settings**.



2. From the **System Settings** list, click **System**.



3. Click **Edit** to modify the current settings.



4. Modify the following parameters as needed.

➤ **Break Strategy:** By changing the break strategy from **Skip** to **Continue**, the system can monitor optical routes even if a break has occurred. The status of optical route will remain as **Active** and it will not change to **Skip**. This will be applied to all the existing RTUs in next synch and as well as on the new RTU.

- **Fiber Test Setup Definition Strategy:** There are three types of definition strategy:

  None: Selecting **None** will not create any of the test setup upon detecting a new route (see Detecting the Fibers Connected to the Optical Ports in the RTU-720 User Guide).

  Monitoring Only: Selecting **Monitoring Only**, will create only one monitoring test and will use a default test setup and a default test program (continuous mode) upon detecting a new route.

  Both: Selecting **Both** will create both types of the test setup (Monitoring and Proactive Maintenance type) upon detecting a new route. Note that a proactive test set-up will use a 45 sec test duration and will be programmed to be executed once per week. All these automatically created test set-ups and test programs can be later modified by a user having the appropriate rights to do so.

- **Data Upload Policy:** Data upload policies are also applied for all RTUs after fiber detection. By default the RTU can be set to limit the amount of data uploaded from RTU to the EMS application, if connection bandwidth is limited or synchronization performance becomes an issue. There are two data upload policies: **Do Not Attach Trace File** and **Attach Trace File.** See Data Upload on *page 84*.

- **Test Type:** There are two test types: **Monitoring** and **Proactive Maintenance**.

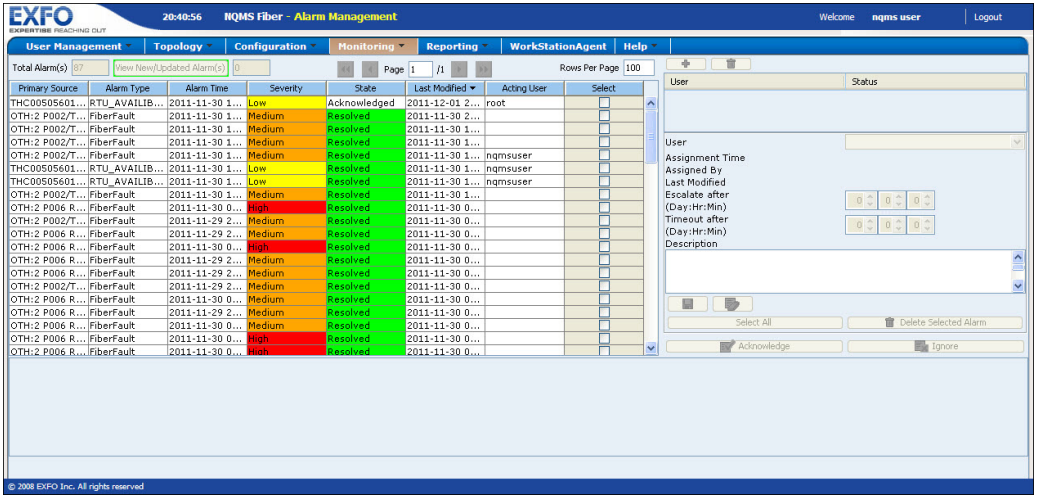
- **Degraded Fiber Handling Strategy** is either **Enabled** or **Disabled**.

5. Click **Save** to apply your changes or **Cancel** to discard them.

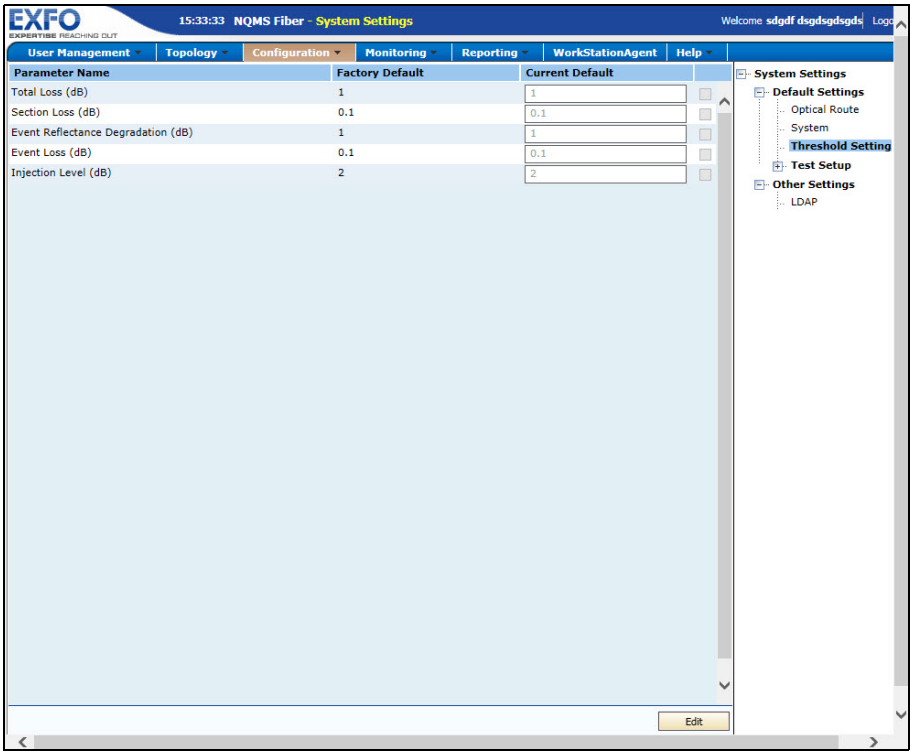
Note: *To revert a parameter to its default value, click **Reset to Default**. To reset all the parameters, click **Reset All to Default**.*

To configure the threshold settings:

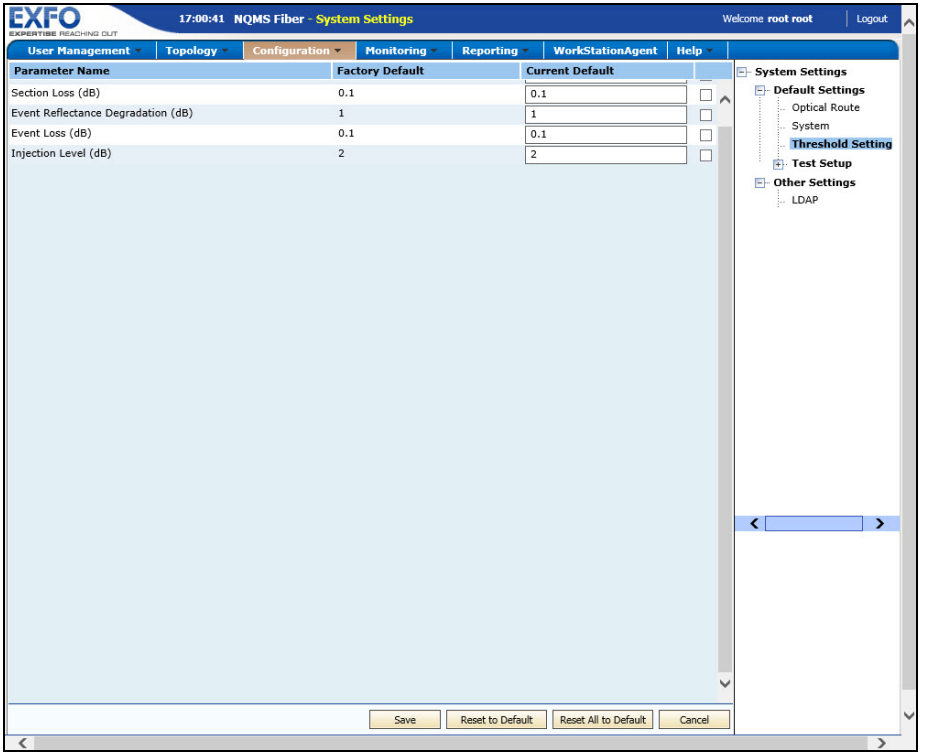
1. From the **Configuration** menu, select **System Settings**.



2. From the **System Settings** list, click **Threshold Setting**.



3. Click **Edit** to modify the current settings.



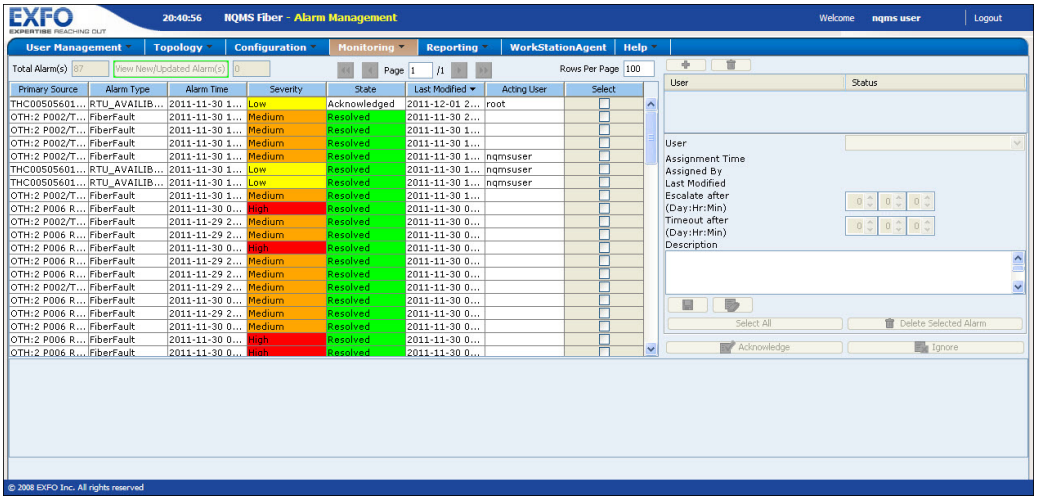
4. Modify the parameters as needed. On modifying the threshold settings, the changes will be applied to new thresholds when added. These fault detection threshold values will be used as defaults if no standard or custom set of thresholds are defined for a test set-up (see Defining Test Setups *on page 79*, where the option of standard set can be de-activated for a particular test, and you can set specific fault detection threshold values).

5. Click **Save** to apply your changes or **Cancel** to discard them.

Note: *To revert a parameter to its default value, click* ***Reset to Default****. To reset all the parameters, click* ***Reset All to Default****.*

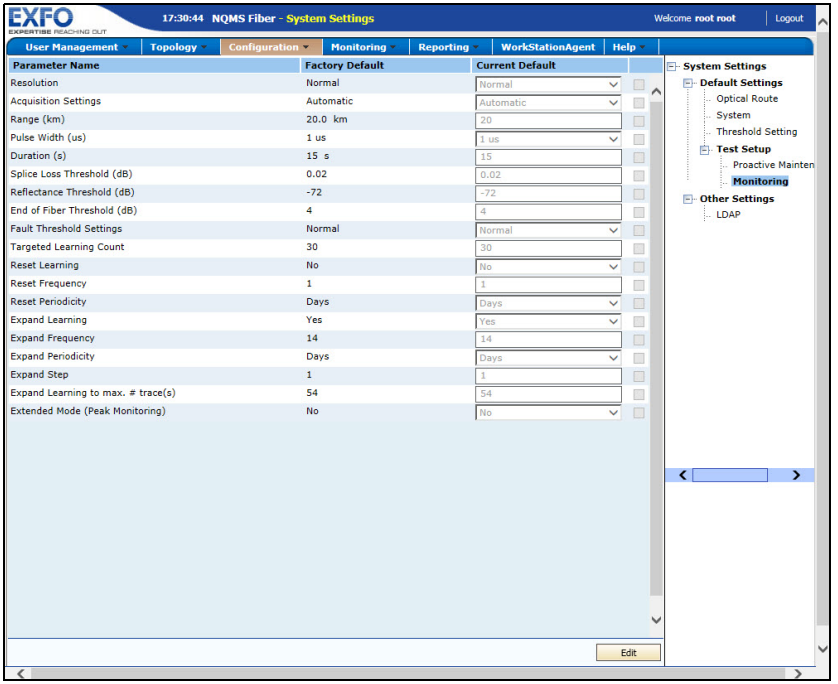
To configure the test setup settings:

1. From the **Configuration** menu, select **System Settings**.

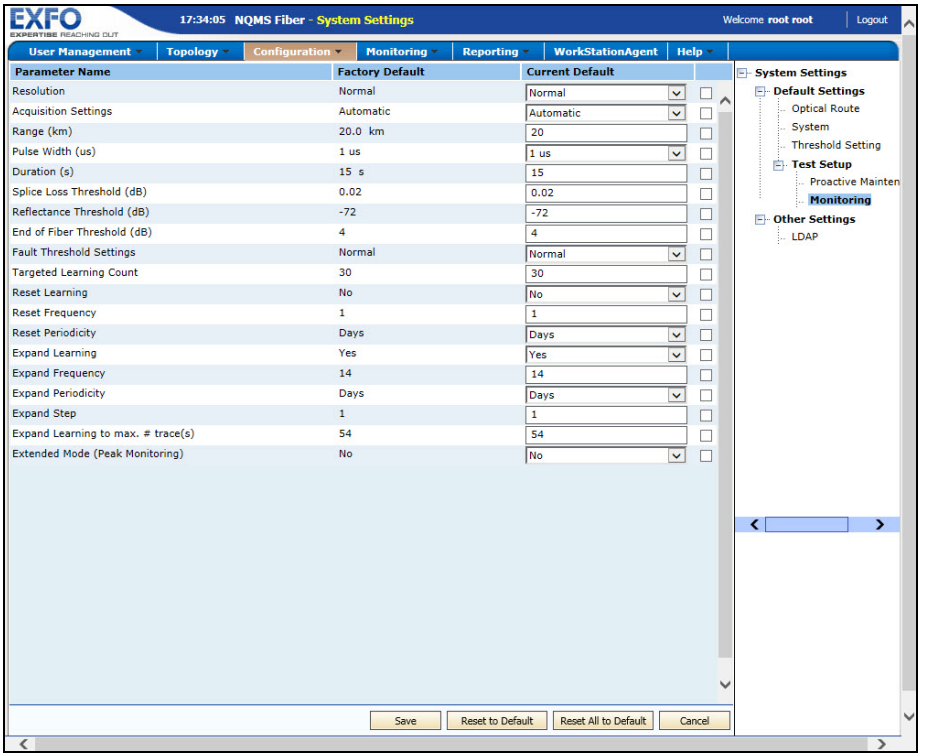


2. From the **System Settings** list, under **Test Setup**, click **Monitoring** or **Proactive Maintenance**.

   You can pre-configure test set-up parameters for both monitoring test set-up and proactive test set-up so that when you create a new test set-up of any of these two types, these values will be used as default test parameters. Default values for test setups will be applied to all the test setups upon creation of new ORs using fiber detection function. Note that by default, test duration will be 10 seconds for a monitoring test set-up and 45 seconds for a proactive test set-up when using the fiber detection function for creating new routes, test set-ups, and programs automatically.


EXFO
EXPERTISE REACHING OUT
17:30:44 NQMS Fiber - System Settings
Welcome root root
Logout
User Management
Topology
Configuration
Monitoring
Reporting
WorkStationAgent
Help
Parameter Name
Factory Default
Current Default
Resolution
Normal
Acquisition Settings
Automatic
Range (km)
20.0 km
Pulse Width (us)
1 us
Duration (s)
15 s
Splice Loss Threshold (dB)
0.02
Reflectance Threshold (dB)
-72
End of Fiber Threshold (dB)
4
Fault Threshold Settings
Normal
Targeted Learning Count
30
Reset Learning
No
Reset Frequency
1
Reset Periodicity
Days
Expand Learning
Yes
Expand Frequency
14
Expand Periodicity
Days
Expand Step
1
Expand Learning to max. # trace(s)
54
Extended Mode (Peak Monitoring)
No
Edit
System Settings
Default Settings
Optical Route
System
Threshold Setting
Test Setup
Proactive Mainten
Monitoring
Other Settings
LDAP

3. Click **Edit** to modify the current settings.



4. Modify the following parameters as needed:

- **Resolution** is the level of data points to be captured. Use **High** resolution feature to obtain more number of data points per acquisition. When data points are comparatively closer to each other, it results in a greater distance resolution for a trace.
- **Acquisition Settings** can be **Automatic** or **Manual**. The automatic acquisition chooses the pulse-width, duration, and range according to the length of the fiber. The manual mode requires input for all these parameters.

- **Range** corresponds to the distance range of the fiber span that you want to test.
- **Pulse Width (us)** corresponds to pulse width of the test signal which you want to send. A wider width allows you to probe further along the fiber, but results in less resolution. A thinner width provides higher resolution but less distance range.
- **Duration** corresponds to acquisition duration. Generally longer duration generates cleaner traces. This is especially applicable with the long distance traces.
- **Splice Loss Threshold (dB)** is for detecting small non-reflective events during trace analysis and when establishing the test setup reference.
- **Reflectance Threshold (dB)** detects small reflective events during trace analysis and when establishing the test setup reference.
- **End of Fiber Threshold (dB)** detects important event loss that could compromise signal transmission during trace analysis and when establishing the test setup reference.
- **Fault Threshold Settings** are used during tests. Select **Breaks only**, **Coarse**, **Normal**, or **Sensitive**.
- **Targeted Learning Count** corresponds to learning counts per learning cycle.
- **Reset Learning, Reset Frequency, and Reset Periodicity** correspond to reset learnings, frequency and the periodicity. For example, if you want to reset learning at every 15 days, the parameters needs to be set accordingly.

- **Expand Learning**, **Expand Frequency**, **Expand Periodicity**, and **Expand Step** correspond to expanding learning cycles, frequency, periodicity, and step. For example, if you want learning to happen every 15 days and want to increase the learning cycle count by 1, then you can set all the parameters accordingly.
- **Expand Learning to max. # trace(s)** is the maximum number of traces per learning cycle.
- **Extended Mode (Peak Monitoring)** - Select this parameter to extend the range of peak monitoring beyond the detected End of Fiber event, or in case of a PON (passive optical network) link with multiple reflectors, beyond a splitter.

5. Click **Save** to apply your changes, or **Cancel** to discard them.

Note: *To revert a parameter to its default value, click **Reset to Default**. To reset all the parameters, click **Reset All to Default**.*

Configuring LDAP Settings

The EMS application supports user authentication by using credentials stored in the EMS application database. You can also use your domain account (user name/password) to access the EMS application. Please refer to the Fiber Guardian Management System section.

Configuring Users

Based on the selection of authentication mode you are added under user management. If the authentication mode is **LDAP**, then only LDAP users are displayed under User s tree list. And if the authentication mode is **Native** then native users are displayed under **User** tree list.

Note: *To add customers through LDAP authentication, you need to create details of customer in the central database. Please refer to the Fiber Guardian Management System section.*

Configuring User Groups

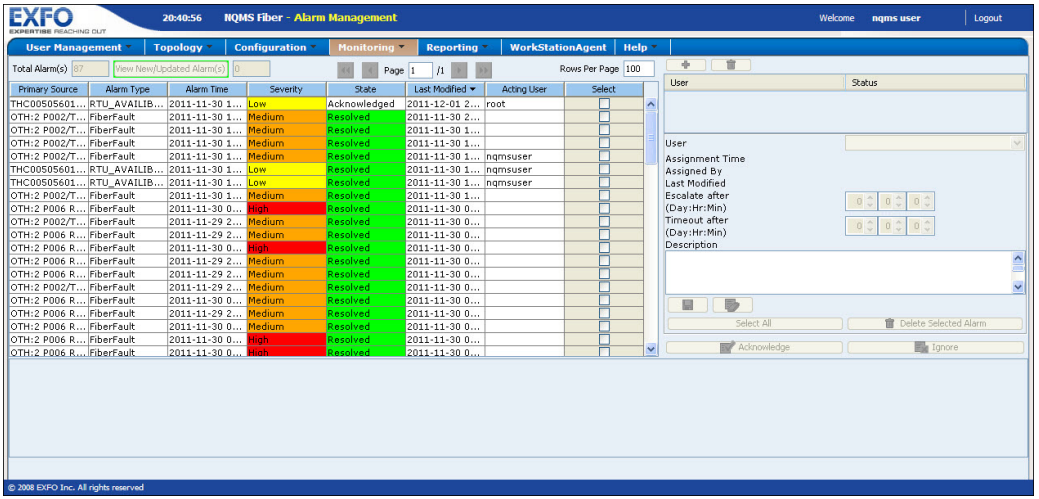
User groups are a set of users associated with each other for a specific purpose. A user group enables you to manage users efficiently. For example, you can send same alerts to all the users of a particular group. With user groups, you can assign or deny access rights to multiple users simultaneously for using various functions. Please refer to the Fiber Guardian Management System section.

Configuring Record Level

A user creating a new record can assign record level permissions that can differ between the users of his group and the other users of any other groups. For example, multiple alarm types can have different owners (typically managers of the different functional groups within the organization), and for each, different access rights to the record can be given, namely None, read-only, of full edit rights. However, if a group does not have access to a specific menu, these permissions are not taken into account. The owner of the record always has full access to the record.

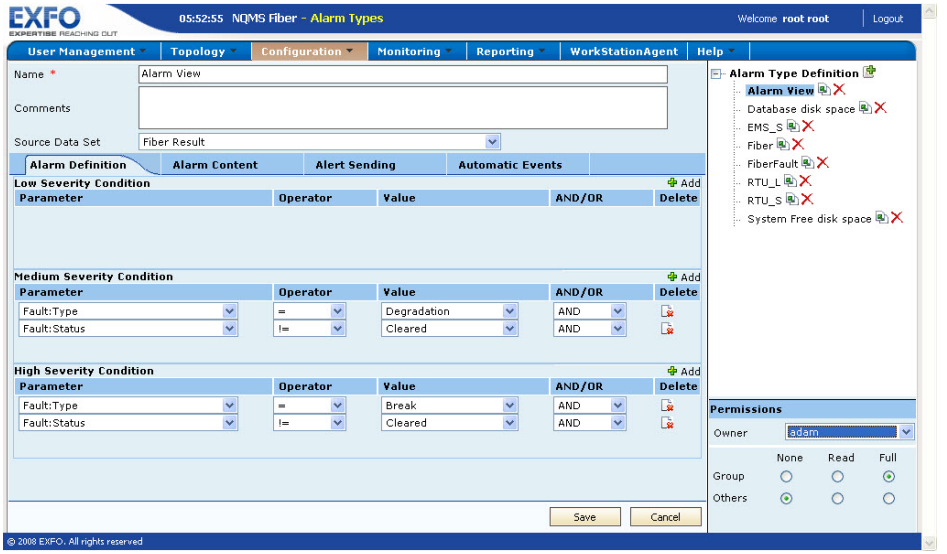
To configure the record level permission:

1. From the **Configuration** menu, select **Alarm Types**.



2. From the **Alarm Type Definition** list, click **Alarm View**.

3. Click **Edit**.

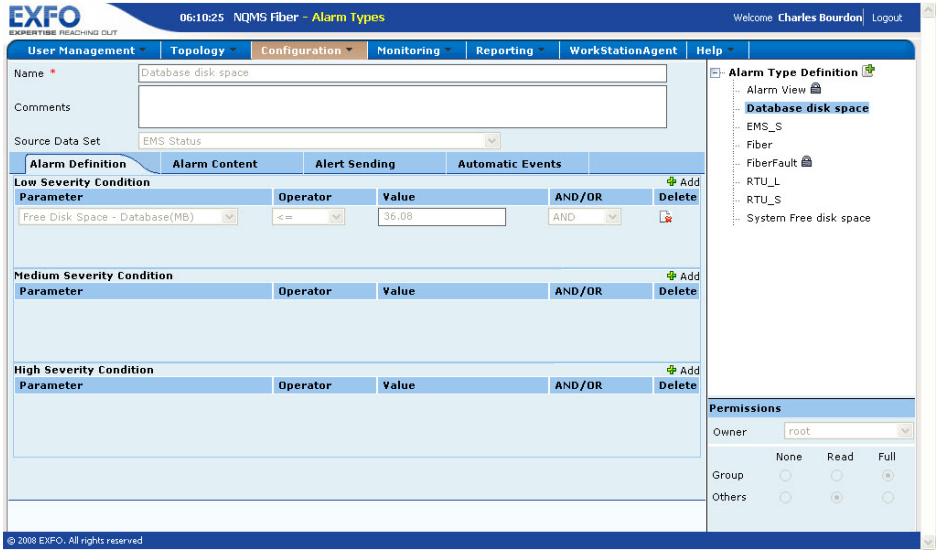


4. In the **Permissions** pane, select the **Owner** that is the admin group user.

5. Select **None**, **Read** or **Full** options for **Groups** and **Others** as required.

6. Click **Save** to apply your changes, or **Cancel** to discard them.

The below screen shows if you have no access to the admin group.



Configuring an RTU

Once you have connected the RTU to the network and configured it with the IP address of the EMS server, a synchronization process is initiated and the EMS server receives and pushes the following details from the RTU.

EMS receives from RTU:

- RTU properties including hardware details, RTU name, and RTU IP settings
- Route details (if already created) and all related test set-up and test program
- All results already existing on RTU except Ad-Hoc test results (if any)
- RTU logs and current status of the various RTU components

EMS pushes to RTU:

- List of users and properties (they become read-only at the RTU level)
- Default threshold sets (they become read-only at the RTU level)
- All default settings - they will become Factory Setting default values on the RTU. Note that if you want an RTU to run with a specific default setting from factory to current, you have to change it on RTU. From the RTU User Interface, you can also revert to default settings from factory to current, by selecting a button placed at the root of the **Configuration/System Settings** tree position.

Note: *When creating the test setups automatically from default settings, the application determines the more appropriate wavelength according to your network.*

Note: *Optical route can only be created from the RTU (using RTU UI) with the* ***detect fiber*** *function.*

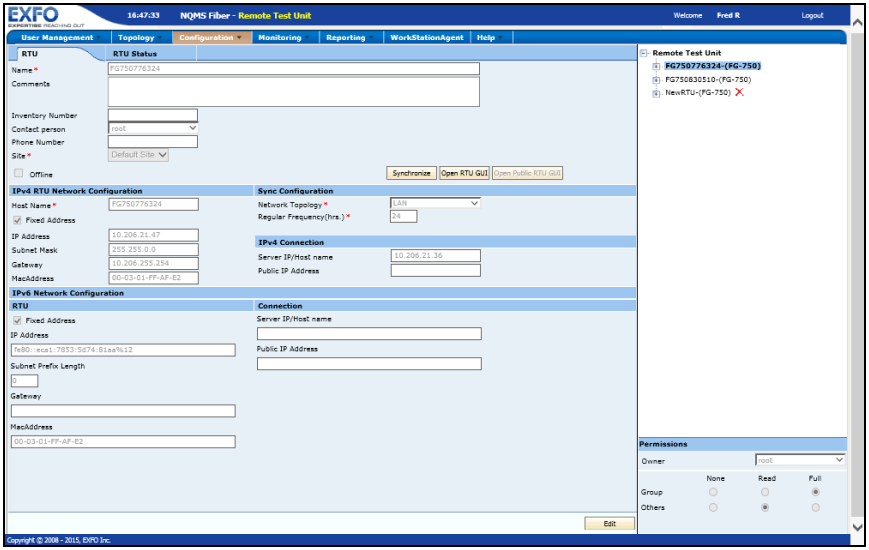
Note: *For more information on configuring RTUs, refer to Configuring the RTU of RTU-720 user guide and Setting Up Your RTU of the FG-750 user guide.*

Viewing and Modifying RTU information

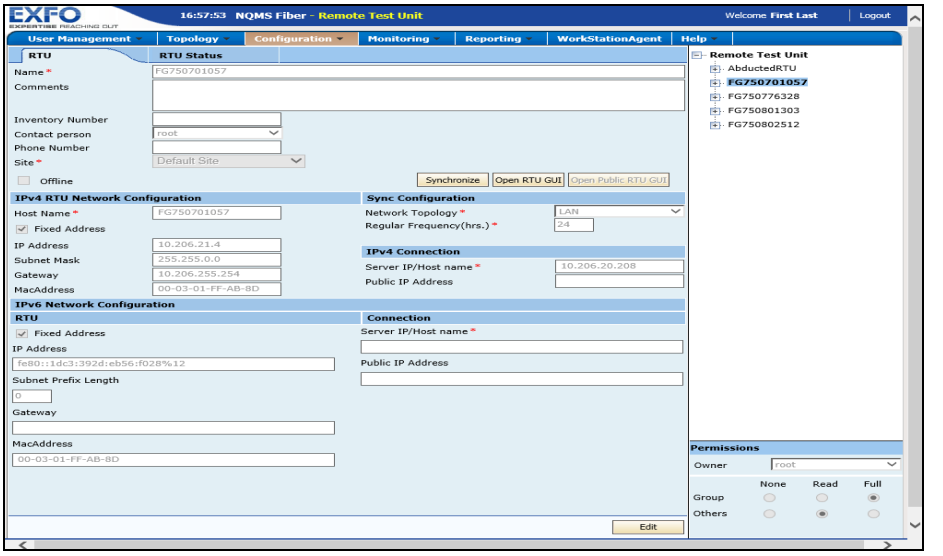
Once RTU is configured with EMS, you can view and modify the RTU information.

To view the RTU:

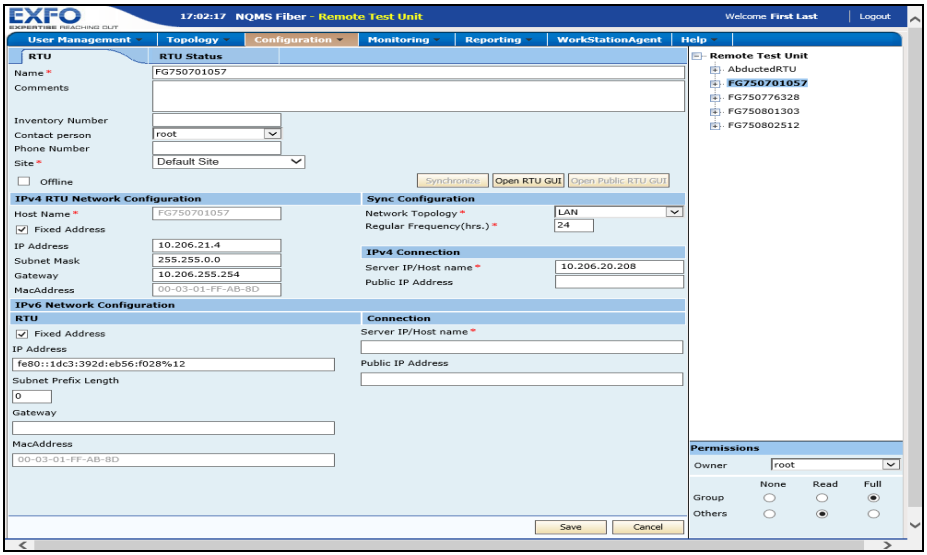
1. From the **Configuration** menu, select **Remote Test Units**.



2. From the **Remote Test Unit** list, select the desired RTU, which you want to view, or modify.



3. You can edit and delete the RTU information. Select the **Edit** button to modify the RTU information.



To edit the RTU information:

1. Enter the required information to update the RTU Information, such as:

   - **Name**: Name of the RTU given or managed by EMS. The **Name** can be different than **Host Name** given to the RTU controller unit.
   - **Comments**: Any comments related to RTU.
   - **Inventory Number**: Inventory Number of the RTU.
   - **Contact Person**: Contact Person for the RTU.
   - **Phone Number**: RTU Contact person cell number.
   - **Site**: RTU installed Site.
   - **Offline**: Select **Offline** to stop the communication between the RTU and EMS. This will stop the Synchronization between the EMS and RTU.

- To start the synchronization of the EMS with the RTU, click the **Synchronize** button. A confirmation message is displayed after the synchronization request is accepted by the EMS.
- To log on to the RTU user interface, click the **Open RTU GUI** button. The RTU GUI is displayed in a separate window.
- To open the RTU GUI on a separate window using the Public IP, click the **Open Public RTU GUI** button. The **Open Public RTU GUI** button is enabled if a Public IP Address is configured for the RTU.

2. Under **IPv4 RTU Network Configuration** covering both RTU-720 and FG-750, enter the required information, such as:
   - **Host Name**: Host name of the RTU.
   - **Fixed Address**: Select **Fixed Address** to change IP Address, Subnet mask, and Gateway which is done locally on the RTU.
   - **IP Address**: IP Address of the RTU.
   - **Subnet Mask**: Subnet mask for the RTU IP.
   - **Gateway**: Gateway for the RTU IP.
   - **MacAddress**: RTU MAC Address automatically receives its value from the network card hardware, and cannot be changed or modified on any hardware/version.
3. Under **Sync Configuration**, provide the following information:
   - **Network Topology**: Select LAN if RTU connected over LAN and select Low bandwidth if RTU are connected via modem.
   - **Regular Frequency (hrs)**: Enter a time frame to automatically synchronize between the RTU and EMS (default is 24 hours).
4. Under **IPv4 Connection** covering both RTU-720 and FG-750, enter the required information such as:
   - **Server IP/Host name**: EMS Server IP address or Domain Name.
   - **Public IP Address**: Public IP Address to Access the RTU.

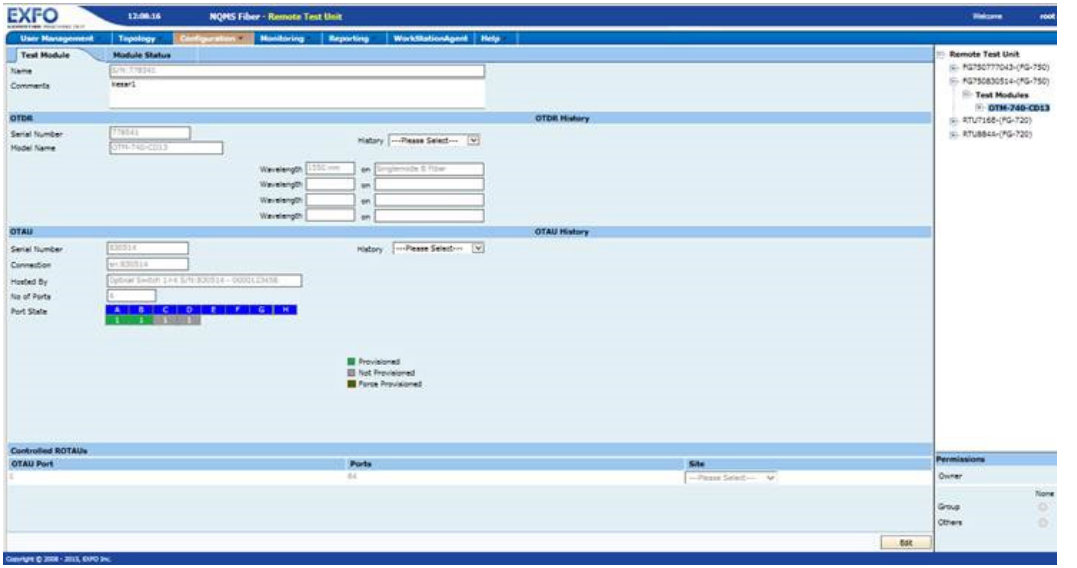
5. Under **IPv6 Network Configuration** (FG-750 only), the required information is the same as IPv4 configuration and connection, listed above.
6. Click **Save** to apply the changes, or **Cancel** to discard them.

Note: *If the FG-750 IP address is modified from the EMS, the RTU is rebooted automatically without notification. Once it reboots, you must manually synchronize with the latest/current IP address. (This is similar to the FG-720 when the RTU IP address is changed, the acknowledgment is sent to the EMS and the RTU is rebooted automatically.)*

When syncing and selecting an FG-750 RTU, the Port representation is different.

To view and modify FG-750 information:

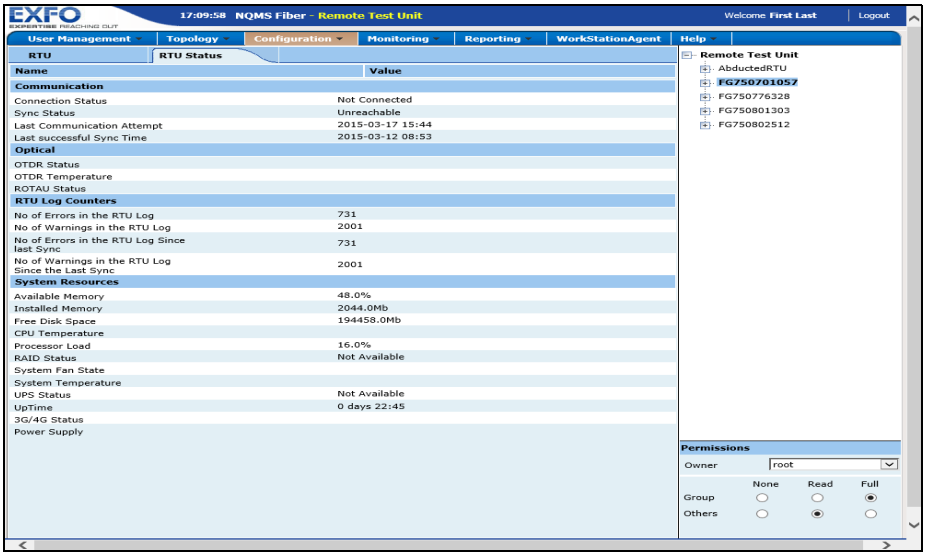
1. In the tree view at the right, select **Test Modules** and the desired FG-750. Here you can view the Port Sate of the RTU.



2. Select **Edit** to make any modifications.

To view the RTU Status:

1. From the Remote Test Unit list, select the desired RTU, and click the **RTU Status** tab.



2. In this page you can view the following information of the selected RTU:

- **Communication**
  - Connection Status
  - Sync Status
  - Last Communication Attempt
  - Last successful Sync Time

- **Optical**
  - OTDR Status
  - OTDR Temperature
  - ROTAU Status
- **RTU Log Counters**
  - No of Errors in the RTU Log
  - No of Warnings in the RTU Log
  - No of Errors in the RTU Log Since last Sync
  - No of Warnings in the RTU Log Since the Last Sync
- **System Resources** (applied to both RTU-720 and FG-750 unless otherwise stated)
  - Available Memory
  - Installed Memory
  - Free Disk Space
  - CPU Temperature
  - Processor Load
  - RAID Status (RTU-720 only)
  - System Fan State (FG-750 only)
  - System Temperature
  - UPS Status (RTU-720 only)
  - UpTime
  - 3G/4G Status (FG-750 only)
  - Power Supply (FG-750 only)

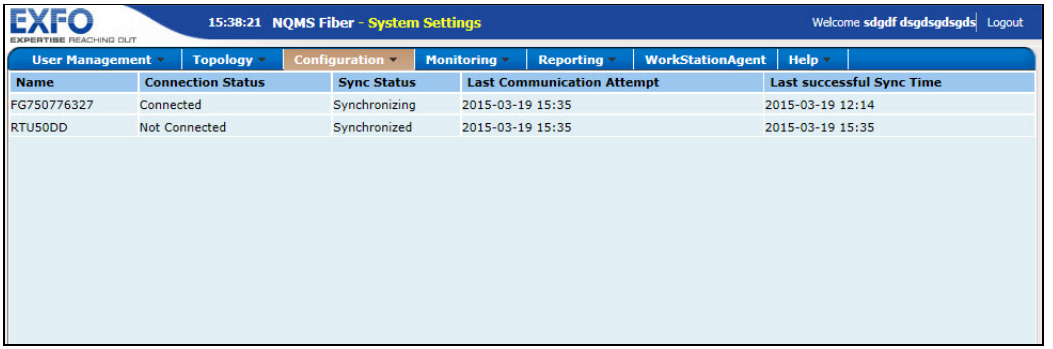
Viewing Status for All RTUs

You can view a consolidated view of all RTUs synchronised with the EMS. The synchronisation details such as the name of the RTU, the connection status, synchronisation status, last successful communication time, and last synchronisation time are displayed.

To view status of all RTUs:

From the **Configuration** menu, click **All RTU Status**.

A consolidated view of all RTUs synchronised with the EMS is displayed.

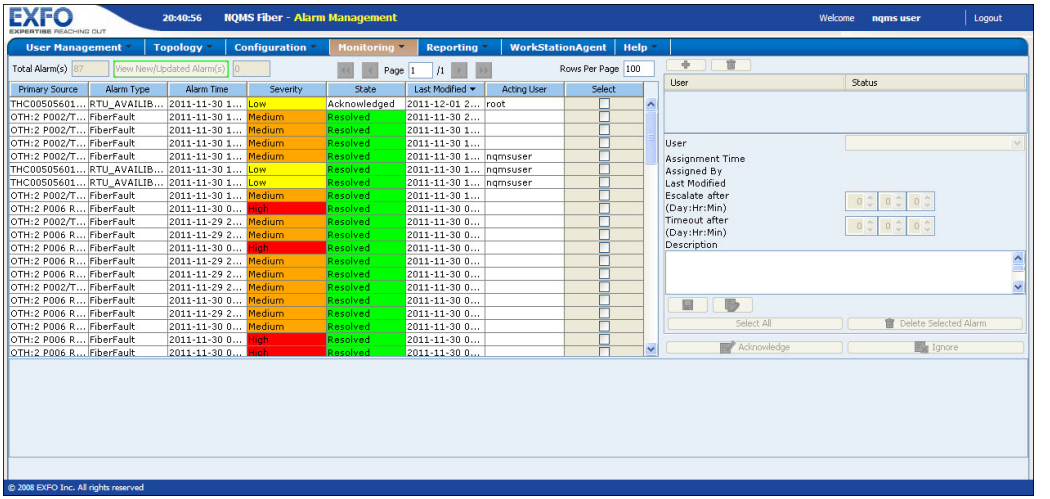


Configuring the Users Duty Schedules

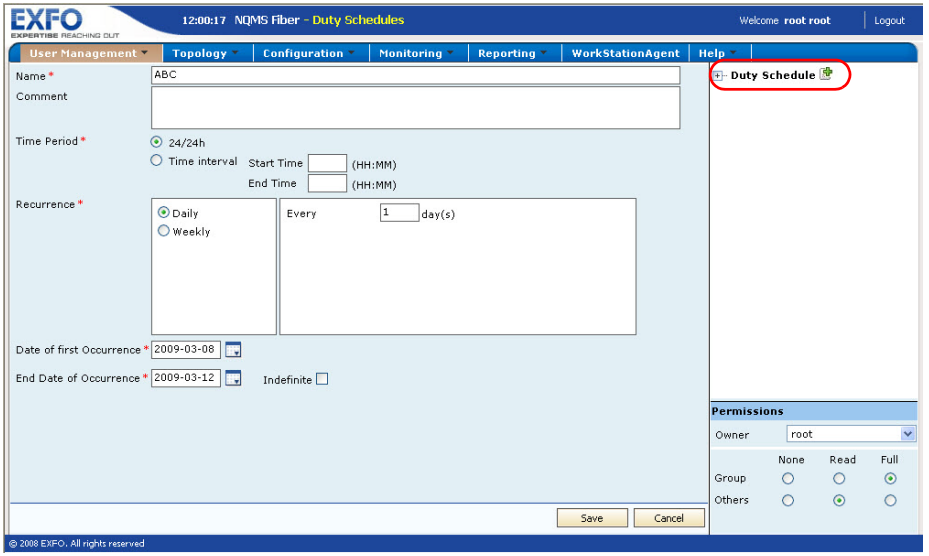
Duty schedules are used for scheduling the date/time of the users working schedule so that they can receive alerts using the selected notification during their scheduled working period.

To add a duty schedule:

1. From the **User Management** menu, select **Duty Schedules**.



2. From the duty schedules list, click .



3. Fill out the required information:

- **Name**: Enter the name.
- **Comment**: Enter the comments.
- **Time period**: select any of the following time period:

  24/24h: to schedule duty 24 hours a day.

  Time interval: to schedule a duty for a specific time. After you have selected this option, the **Start Time** and **End Time** text boxes are displayed. Specify the start time and end time of the duty schedule.

- **Recurrence**: select any of the following recurrence:

  Daily: to recur the duty schedule daily. Specify the number of days after which a new a new schedule must start.

  Weekly: to recur the duty schedule weekly. Specify the number of days after which a new a new schedule must start. You can also select the days of the week on which the duty schedule must recur.

- **Date of first Occurrence**: click the calendar icon to select the date of first occurrence.
- **End Date of Occurrence**: click the calendar icon to select the end date of first occurrence.
- **Indefinite**: select this check box to continue the duty schedule for an indefinite period. When this check box is selected, the **End Date of Occurrence** box disappears.

4. Click **Save** to apply your changes, or **Cancel** to discard them.

Understanding Date and Time Management

The EMS server and all the RTUs are connected to an NTP server responsible for the time synchronization between the RTUs and the EMS server. The NTP server is, by default, set to the time of the first sync to EMS IP address, as the effective time server. You must insure the server stratum level on your EMS server is adequate: consult EXFO technical support on page 303 for the appropriate set-up.

When you modify the time zone, the application will show the time for the event in the selected time zone. However, this modification is reflected only after you log on to the system again.

CAUTION

DO NOT modify the time zone of the EMS server and the RTU. Otherwise, your system will no longer function properly.

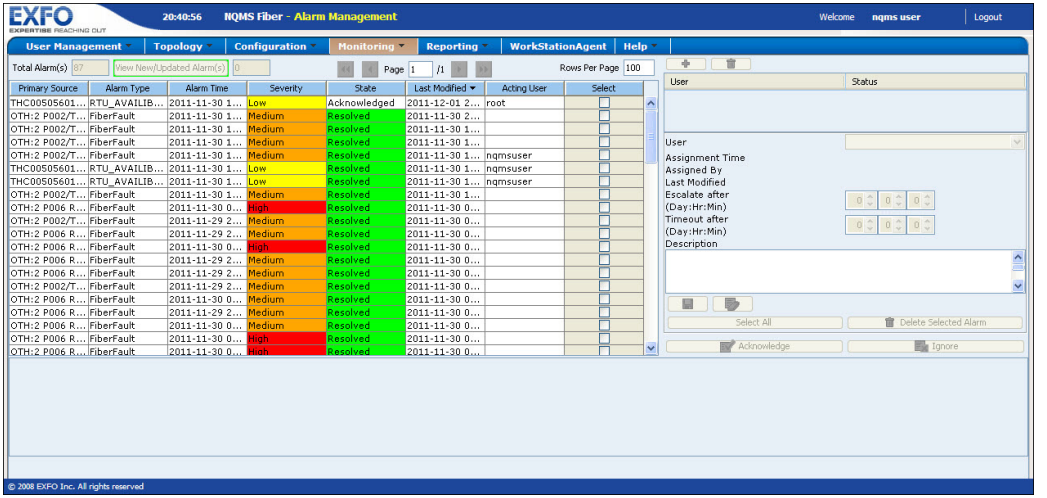
For servers running Linux, the time zone must be set to Casablanca.

For servers running on Windows Server, the time zone must be set to GMT.

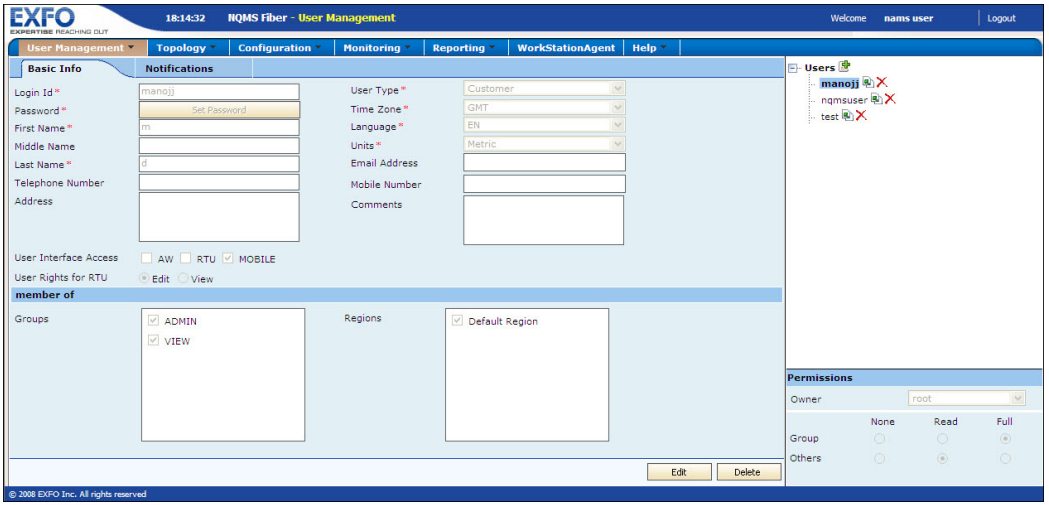
In addition to this, you can configure the required time zone by clicking **User** under the **User Management** menu. You can see events according to the time zone configured for you.

To modify the time zone:

1. From the **User Management** menu, select **Users**.



2. From the users list, click the user whose timezone settings you want to modify.



3. Click **Edit** to modify the current settings.
4. Modify the **Time Zone** parameters as needed.
5. Click **Save** to apply your changes, or **Cancel** to discard them.

5 Managing Optical Routes

This chapter provides information about setting test setups and test programs for managing optical routes. In addition, it also provides information on how to view the test setup status and test history.

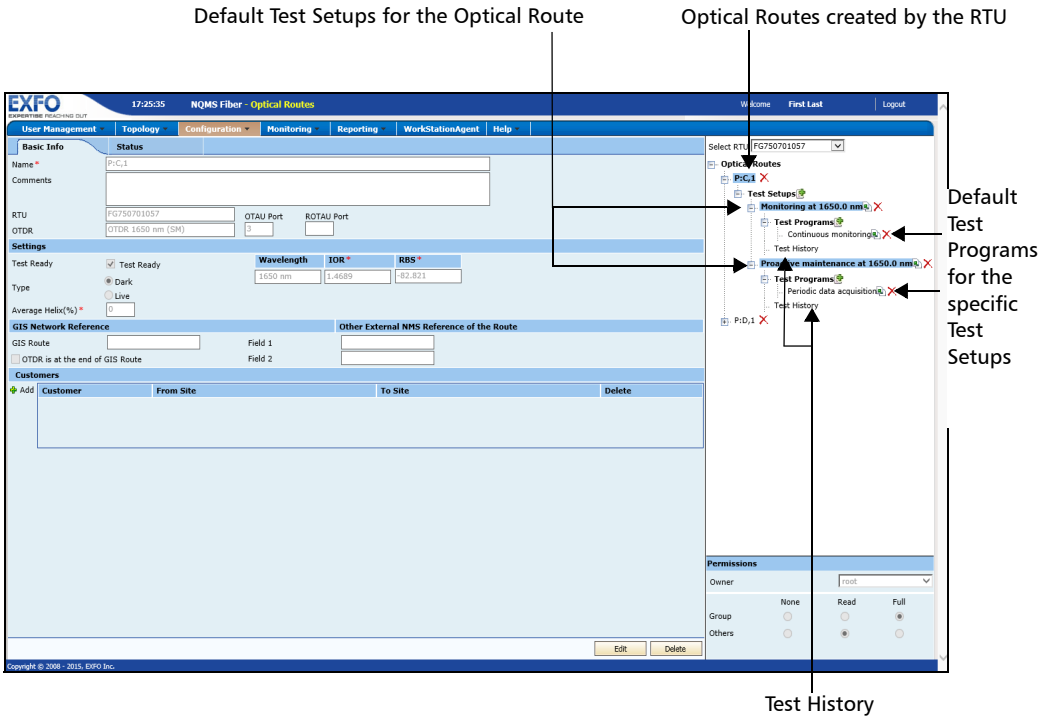
The configuration of optical routes, test setups and test programs has to be synchronized to be applied to the RTUs. Synchronization is performed every 24 hours by default or upon request.

Defining Optical Routes

By default, after a port is detected, the RTU automatically creates:

- An optical route for each of the ports the RTU detects, that is one per port to which a fiber is connected.
- Two default test setups for each route.
- One test program for each of the test setups.

Each optical route can have one or more test setups and each test setup can have one or more test programs.

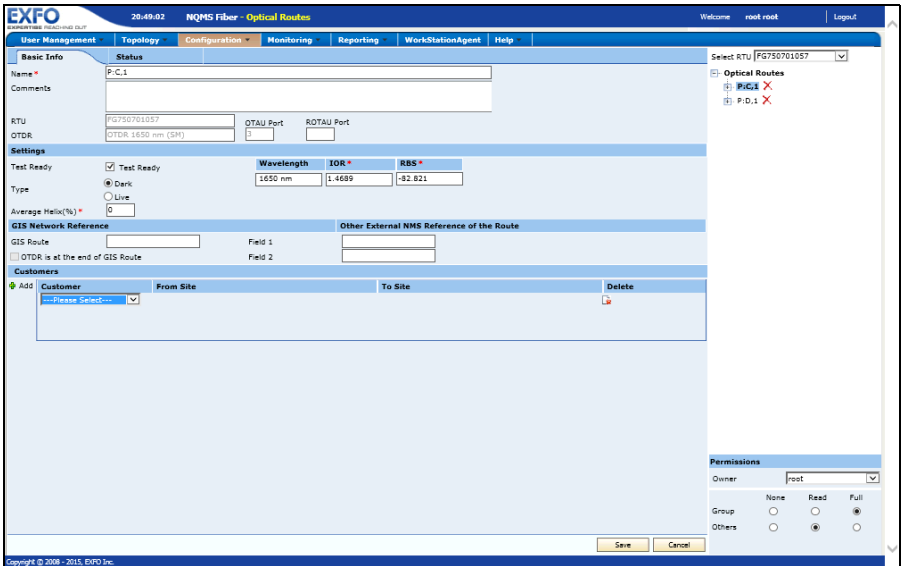


The NQMSfiber system administrator can set the default settings for the optical routes in the **System Settings** window.

Note: *Mandatory items are identified by a red asterisk (*).*

To modify an Optical Route:

1. From the **Configuration** menu, select **Optical Routes**.
2. Select the optical route you want to modify, from the right-hand side tree structure.
3. Click **Edit**.



Note: *Only certain fields can be edited.*

4. Fill out the required information in the editable fields:

➤ **Name**: modify the name of the optical route. The route name is mandatory and cannot be deleted.

➤ **Comments:** enter the comments for the optical route.

4a. Under **Settings**, fill out the required information:

➤ Select the **Test Ready** check box to indicate that the RTU can perform tests on this optical route.

- **Type**: select a fiber type. A **Dark** fiber is a spare fiber that is not used for transmission whereas a **Live** fiber is currently used for transmission.
- **Average Helix (%)**: modify the average helix value, if desired.
- **Wavelength**: displays the supporting wavelength of the fiber.
- **IOR**: enter the IOR value of the fiber.
- **RBS**: enter the RBS value of the fiber.

4b. Under **GIS Network Reference**, enter an ID or name or select from the auto-complete drop down list of items (in the case of an integrated solution) for **GIS Route** and fill the desired information in the **Other External NMS Reference of the Route**.

4c. Select the **OTDR is at the end of GIS Route** check box to arrange the route details in **Trace view/linear view** that is locations and fibers in opposite direction, than how it was created in the network documentation part (for example, OSPInSight).

4d. Add the **Customers** by clicking the icon; you can add as many customers as required. Click the icon to delete the added customers.

5. Click **Save** to apply your changes, or **Cancel** to discard them.

Associating the Customer to Optical Route:

1. Select the optical route you want to modify.

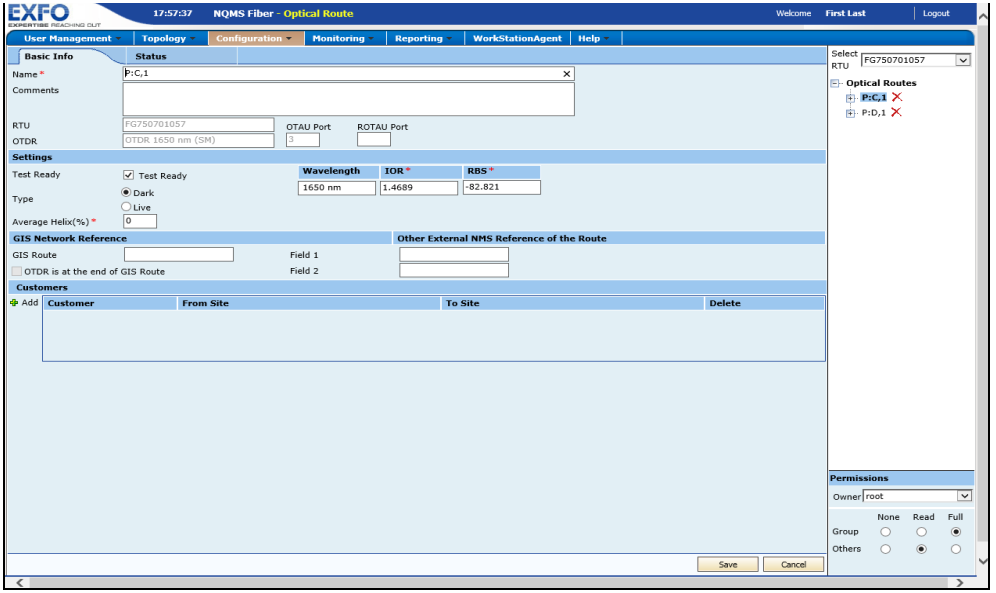
2. Click **Edit**.

3. Fill out the required information in the editable fields, same as above, except for the GIS information.

4. Click **Save** to apply your changes, or **Cancel** to discard them.

Associating the Customer with OSPInSight to an Entire Route:

1. From the **Optical Routes**, select the optical route you want to modify.
2. Click **Edit**.



3. Fill out the required information in the editable fields:

➤ **Name**: modify the name of the optical route. The route name is mandatory and cannot be deleted.

➤ **Comments**: enter the comments for the optical route.

3a. Under **Settings**, fill out the required information:

➤ Select the **Test Ready** check box to indicate that the RTU can perform tests on this optical route.

➤ **Type**: select a fiber type. A **Dark** fiber is a spare fiber that is not used for transmission whereas a **Live** fiber is currently used for transmission.

- **Average Helix (%)**: modify the average helix value, if desired.
- **Wavelength**: displays the supporting wavelength of the fiber.
- **IOR**: enter the IOR value of the fiber.
- **RBS**: enter the RBS value of the fiber.

3b. Under **GIS Network Reference**, select from the drop down list the *saved route* item from OSPinSight you want to associate here, and fill the desired information in the **Other External NMS Reference of the Route**.

3c. Check the **OTDR is at the end of GIS Route** box to arrange the route details in **Trace view/linear view** that is locations and fibers in opposite direction, than how it was created in the network documentation part (for example, OSPInSight).

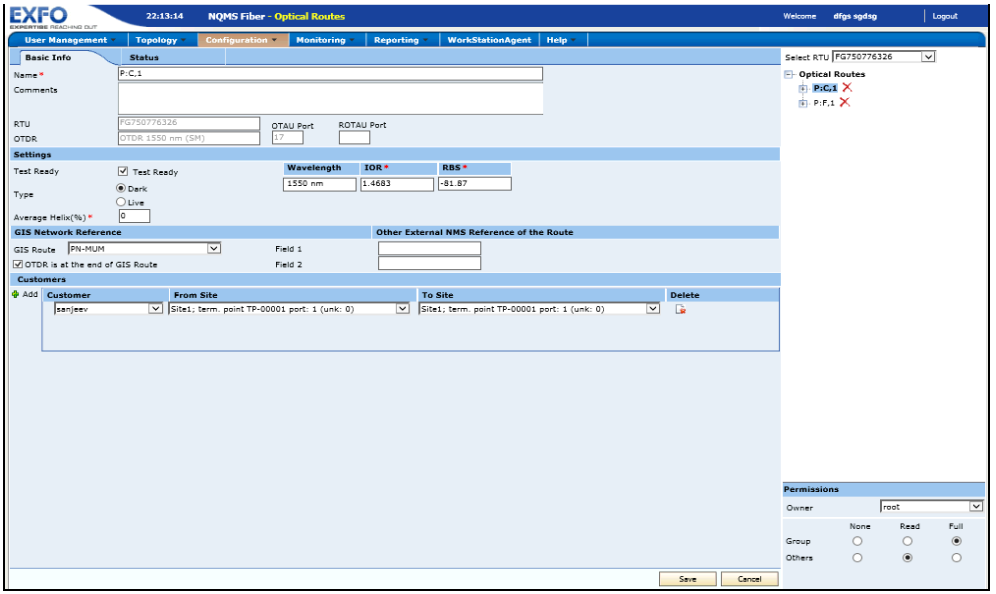
3d. Add the **Customers** by clicking the icon; you can add as many customers as required. Click the icon to delete the added customers.

4. Select **From Site** and **To Site** from drop down list. **From Site** and **To Site** have to be the first and last sites of the saved route, which appear first and last in the drop down list.

5. Click **Save** to apply your changes, or **Cancel** to discard them.

Associating the Customer with OSPInSight to One or Multiple Segments of a Route:

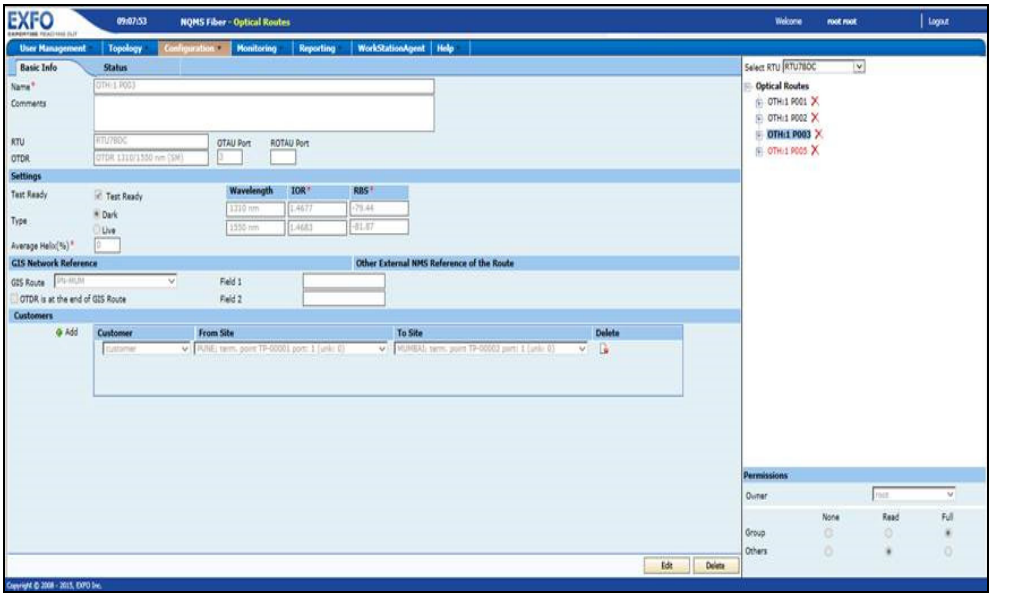
1. From the **Optical Routes**, select the optical route you want to modify.
2. Click **Edit**.



3. Select the **GIS Route** from the GIS route list.
4. Add the **Customers** by clicking the Add icon.

5. Select the customer **From Site** to associate it to a segment of route.

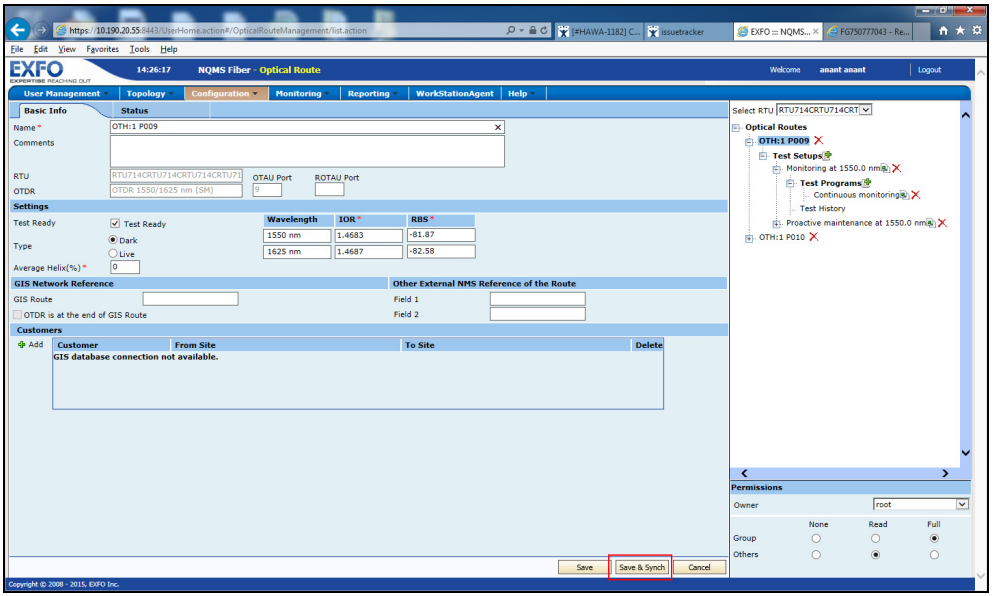
   You can add as many customers and sites as required. Click the icon to delete the added customers.



6. Click **Save** to apply your changes, or **Cancel** to discard them.

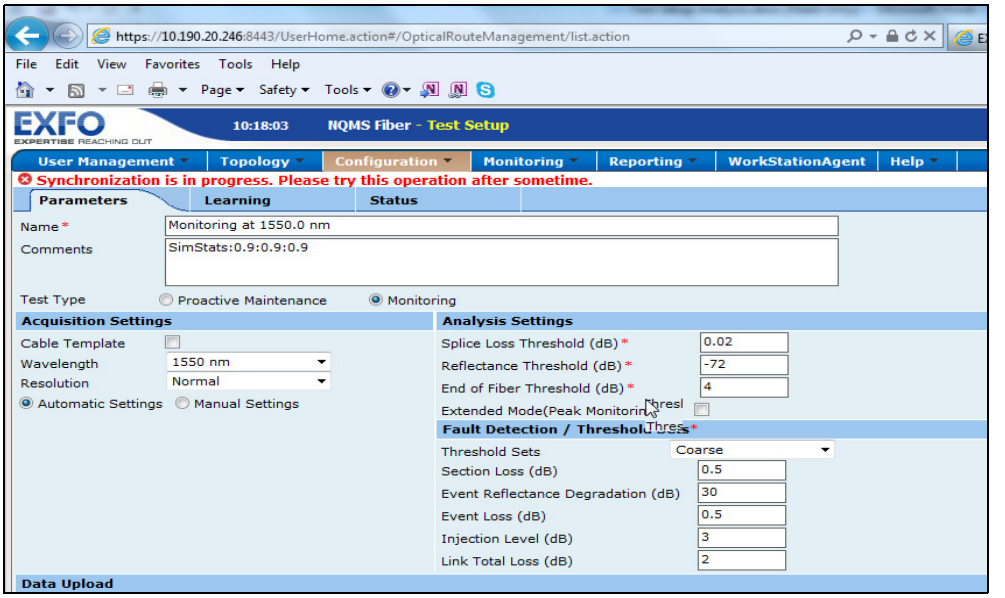
Partial Synchronization on the Optical Route Page

The **Save & Sync** button is available on the **Optical Route** page for partial synchronization.



- When you add/edit an **Optical Route**, the following 2 option-buttons are available to save the changes:
  - **Save** only saves the updated data to the EMS database.
  - **Save & Sync** saves the updated data to the EMS database and initiates a partial synchronization for the selected RTU.
- RTU web services calls are limited in partial sync. Only data related to **Optical Route**, **Test Setup**, and **Test Program** will be synced.
- For **Save & Sync**, all previous and newly-added data related to **Optical Route**, **Test Setup**, and **Test Program** will be synced to the specific RTU. This reduces the overall synchronization time and will not block the next full synchronization for the same RTU for a longer time.

➤ When full sync for a specific RTU is already in progress, initiating **Save & Sync** for the same RTU will not happen, and the message in red below is displayed. In this case, modified data will not be saved to the EMS database. Use the **Save** function to save the data locally.



Defining Test Setups

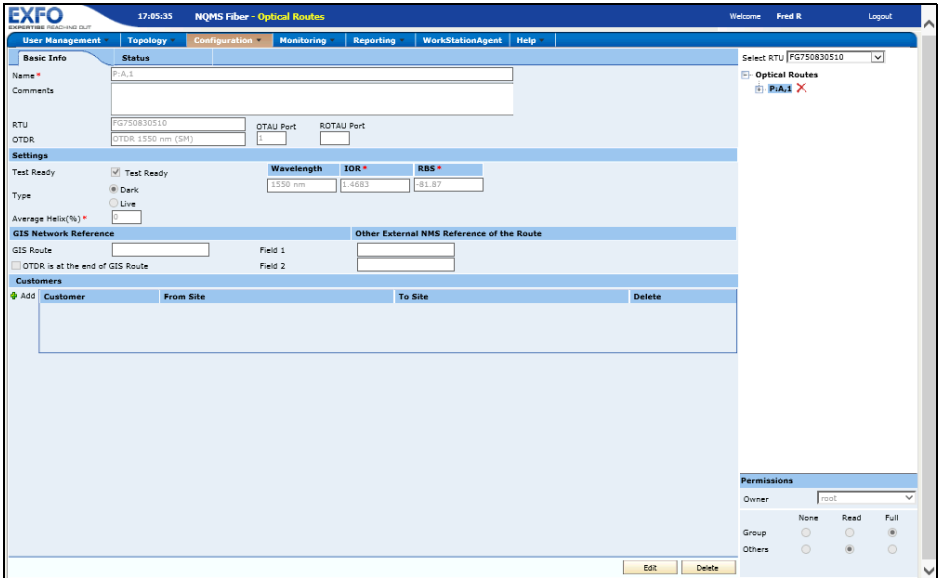
In NQMSfiber, the monitored optical routes are associated with test setups for monitoring and proactive maintenance. Test setups define the measurement parameters such as wavelength, pulse settings, thresholds, reference data, etc., and contain one or more test programs. Test programs, either for continuous monitoring or periodic data acquisition, describe the start and end dates and periodicity of jobs.

The test-setups can be created automatically by the system based on the successful detect fiber function on the RTU (see Defining System Setting Parameters *on page 31* and Detect Fiber Function section in the RTU user Guide).

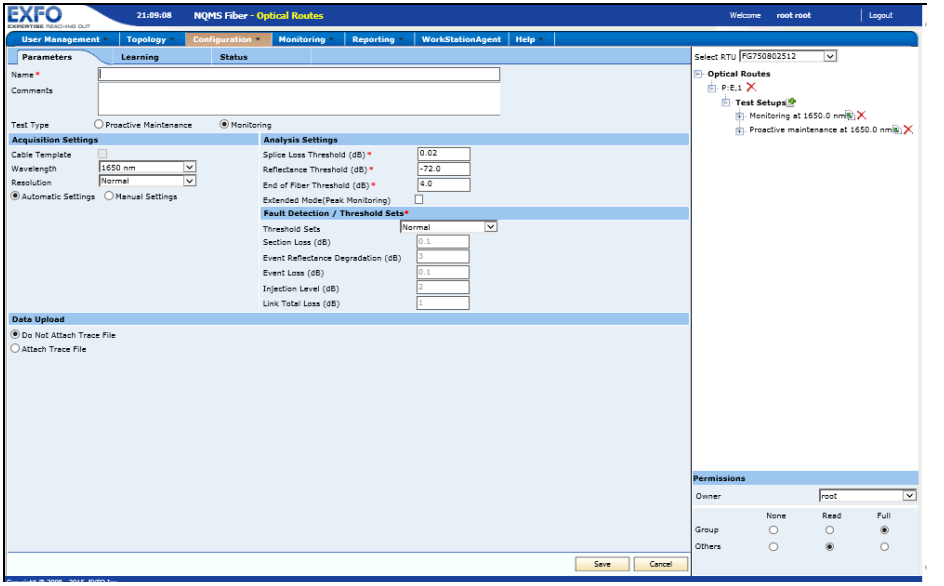
The NQMSfiber system administrator can set the default settings for the test setups in the **System Settings** window.

To add a new test setup:

1. From the **Configuration** menu, select **Optical Routes**.



2. Select the optical route for which you want to add a test setup.
3. From the **Test Setups** list, click .



4. Fill out the required information:

➤ **Name**

➤ **Comments**

➤ **Test Type**: select one of the following:

  ➤ **Monitoring**: test results are stored within the EMS database only when a fault is detected in the optical route.

  ➤ **Proactive Maintenance**: test results are stored irrespective of any faults detected or not.

- **Acquisition Settings**: fill out the required information for the following values:

Note: *Cable Template check box is for display purpose only and you cannot modify its state. The check box is automatically selected or cleared during the synchronization process with the RTU. When the check box is selected, all the parameters under **Acquisitions Settings** are displayed in a read-only mode.*

  - **Wavelength**: you can set the wavelength.
  - **Resolution**: you can select the high-resolution feature to obtain more data points per acquisition. This way, the data points will be closer to each other, which will result in a greater distance resolution for the trace.

IMPORTANT

EXFO does not recommend to test in high resolution if the acquisition time is less than 15 seconds. It may be impossible to obtain acceptable performance with this combination of settings.

  - **Automatic Settings**: to let the RTU determine the best **Range**, **Pulse Width** and **Duration** values.
  - **Manual Settings**: select the required **Range**, **Pulse Width** and **Duration** values from the list of values provided.

- **Analysis Settings**: fill out the required information about the following values:
  - **Splice Loss Threshold (db)**: is an event loss value above which a lossy event will be identified and located onto the reference trace.
  - **Reflectance Threshold (db)**: is a reflectance value above which a reflective event will be identified and located onto the reference trace.

- **End of Fiber Threshold (db)**: is an event loss value above which a lossy event will be identified as end of fiber.
- **Extended Mode (Peak Monitoring)**: allows the application to search for peaks created by reflective events after a detected end of fiber event, if peak level is above noise by 6 dB (such as those caused by UPC connectors) and set the extended monitoring range link to the last detected peak. In this case, any peak in between the end of fiber (Rayleigh) and extended range peak location will be monitored for possible peak level degradation faults.

- **Fault Detection/Threshold Sets**: in case of alarms for which the fault degradation level is considered acceptable, you can change threshold for that particular test setup by changing **Fault Detection** settings. For example, If fault is present for reflective peak scenario as 1 db initially and now that needs to be set to 10 db threshold. You can change the parameter in fault detection section to 10 db. When you change these parameters, fault will be cleared, alarm gets resolved and new reference will be taken on RTU. You can create a custom set of threshold that will be used for any new test set-up. Set the following parameters as desired:
  - **Threshold Sets** allows you to set the threshold values to **Breaks only**, **Coarse**, **Normal**, or **Sensitive**.
  - **Section Loss (dB):** is a range over which the OTDR does not detects any localized events at the time of referencing the test, but it detects a typical fiber attenuation, so that the OTDR considers that a fiber section truly exists. Here you can adjust the threshold above which a given section will be identified as faulty. In this case, the fault min and max position are the beginning and the end of the section. This is a distributed type of fault, usually raised when no new localized event has been detected but the difference in section loss, higher than the threshold set for a section, is attained.

- **Event Reflectance Degradation (dB):** a loss and a reflectance value are normally specified for reflective events. Reflectance changes are tracked through a change in reflective peak level. This is mainly used in live fiber monitoring where the link reflectance have to be measured and controlled. For dark fiber monitoring cases, threshold should be set to tight values in case extended range monitoring is used. When a reflective spike reaches the maximum level, its top will be clipped due to the saturation of the detector and creates an erratic fault conditions.
- **Event Loss (dB):** an event can be defined as the point at which change in the transmission properties of light can be measured. Events can consist of losses due to transmission, splices, connectors or breaks. This event indicates a discontinuity in the fiber observable by the OTDR instrument as a sudden drop in the downward slope. The system will compare events loss part of test set-up reference trace with those of current measurement, and if an event loss had increased by more than this threshold, the measurement will result as an event loss fault threshold type. If a new event appears where none was detected in the first reference trace of the test set up, same fault will be reported. Finally, if an event shows a loss greater than End of Fiber Threshold value (typically 4 dB), than the fault type is a break.
- **Injection Level (dB)**: it is the amount of light that leaks out or is otherwise lost after being inserted into a fiber either from a light source or another fiber. Set this threshold to few dBs for creating fault and optionally alarm, related to a degradation of injection level typically due to misconnection between OTDR and internal switch, or between OTH-700 output ports and the fibers under test. Change in injection level can also indicate a degradation of OTDR active components.
- **Link Total Loss (dB)**: it is the cumulative loss along the optical route. A distributed stress on one or multiple cable spans, which does not produce any new detectable event but affects the attenuation of one or multiple sections of the route, can be

detected by setting this threshold to the desired value. For example, a route with 10 splice events, and event loss threshold set to 0.3 dB, total link loss threshold set to 1 dB and assume each splice degrades simultaneously by 0.2 dB, none of the events will create an event loss fault as degradation levels are below 0.3 dB threshold, but the total link loss threshold limit will be reached after the fifth event. At that event, a total link loss degradation fault will be created, providing the position of the fault as the event at which cumulative loss reached or surpassed the threshold for total link loss.

- **Data Upload** allows you to select whether or not to **Attach Trace File**.
  - **Proactive maintenance** results are uploaded without their TRC file.

5. Click **Save** to apply your changes, or **Cancel** to discard them.

Note: *For creating new test setup, the default values can be changed in System Settings. See* Defining System Setting Parameters *on page 31.*

Note: *If a test set-up is deleted, all related results and alarms will be deleted as well.*

Configuring Learning Sessions

A learning phase is a key provisioning function of NQMSfiber. This function learns about the fiber under test. It creates a series of statistics on the stability of the link loss and every single event part of the fiber reference trace. Stable events or sections can then be monitored more closely, while the less stable ones, such as the very far end portion of the trace, obtained from the system with the best possible fault detection thresholds considering:

- SNR of the events and sections that are at the far end of the link.
- The measurement settings used (for example, short or long pulse).
- Short-term varying environmental conditions, such as daily temperature variations, mechanical vibrations in interconnecting sites, etc.

The learning phase actualizes, for a preset number of acquisitions, the mean loss of all events and sections initially detected with the first reference trace, the reflecting event peak OTDR values and their reflectance, as well as total link loss. The system establishes and updates the best min/max fault detection limits based on a statistical analysis of each measurement performed during the learning process.

By default, learning is preset to capture 30 acquisitions based on test program defined for the test set-up. For example, in case of an 8 port RTU, if a 15 seconds test is created for each port with a continuous monitoring program, every 2 minutes the same port will be retested and the acquisition part of the learning cycle. After 1 hour, all initial cycle learning acquisitions will be completed. Later on, one acquisition for every 2 weeks will be added to the dataset for up to a maximum of 54 counts. You can change these settings. Learning serves various purposes:

- Automatic adjustment of thresholds based on whether an event or section is considered stable or unstable.
- Dynamic adjustment, either tighter or looser, of thresholds based on slow variations (for example, seasons).

- ➤ Resets learning automatically or manually every new season and keeps the same reference data over long period of time.
- ➤ Creates a report on min, max, average, standard deviation statistical values and analysis for each test set-up.
- ➤ Allows the systems to track degradation and alerts only when there is significant change from previous state (avoid toggling situation).
- ➤ Extends learning count or increases target for a given cycle to clear the fault on one particular location along the route without augmenting the threshold on all the other events or sections.

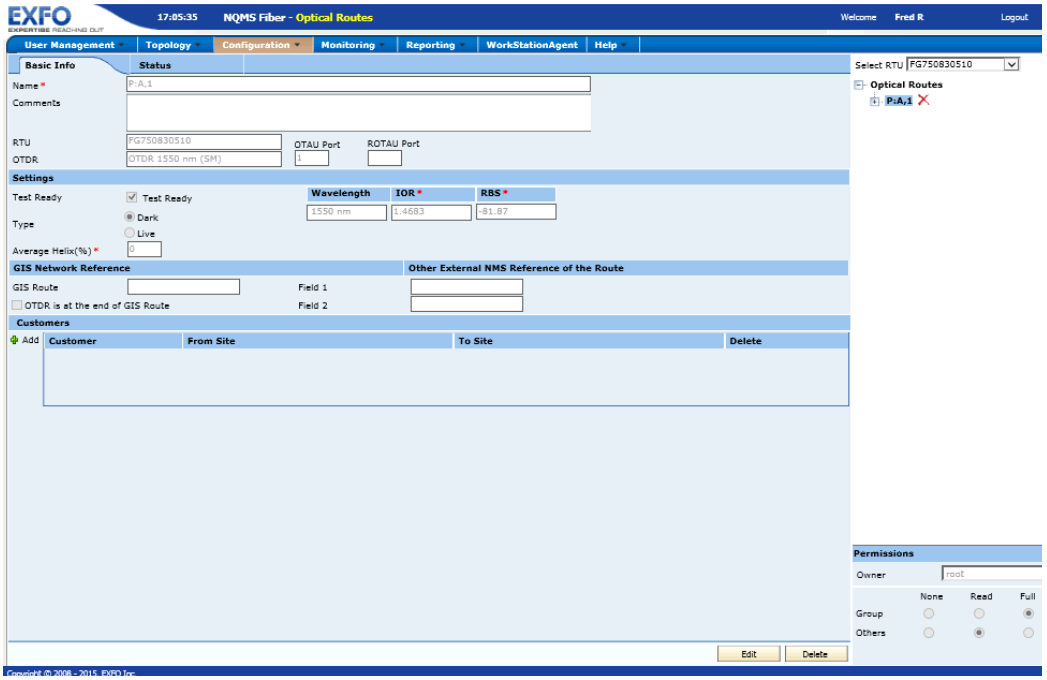
Note: *If a fault currently exists for a test set-up on RTU (and optionally an alarm is opened), learning count for the current cycle cannot be extended. If a fault is intermittent (degradation going & leaving), you can extend learning but you can only do it when fault is cleared.*

Note: *As soon as learning cycle starts or being reset, system can still capture fault degradation above 2 dB or breaks. Open the reference trace for a test set-up to see the thresholds applied during learning, and after learning cycle is completed. Thresholds will gradually tight-up down to specified value on stable events or best possible statistical thresholds (applied) on less stable ones.*

Note: *The threshold limits (or threshold set) specified for a test are the **target** thresholds, while the **applied** thresholds are the currently applied limits, above or below average value. In most cases, target and applied values should be equal or similar at the end of the learning cycle.*

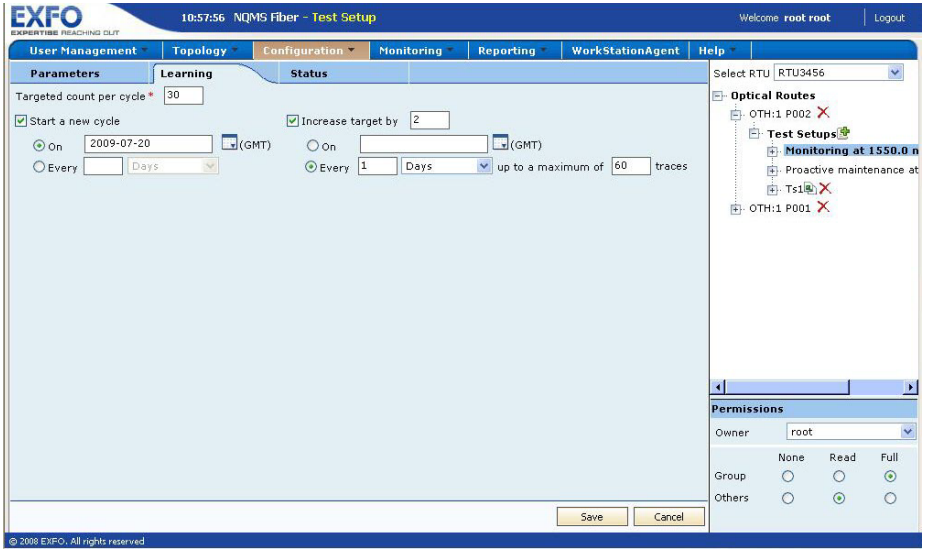
To configure a learning session:

1. From the **Configuration** menu, select **Optical Routes**.



2. Select the optical route for which you have to configure a learning session.
3. From the tree view, select **Test Setups**.
4. From the tree view, select the test setup for which you want to configure a learning session.

5. Click the **Learning** tab.



6. Fill out the required information:

➤ **Targeted count per cycle**: number of acquisitions per learning cycle.

➤ **Start a new cycle**: select this check box to start a new learning cycle. You can enter a date or specify the period to schedule the learning session.

➤ **Increase target by**: select this check box and specify the number of extra acquisitions that will be performed when the learning cycle is complete. You can also set the maximum number of traces. This is usually for reference data to encompass expected variations, or for capturing acquisitions and build more statistics or for automatically adjust fault detection thresholds, the applied ones, to the current situation with the fiber. It should be noted that learning data are used to set for example the average value from which fault detection thresholds are applied.

7. Click **Save** to apply your changes, or **Cancel** to discard them.

Note: *Reset learning and obtain new average loss, re-adjusted thresholds at beginning of a new season for the same reference trace.*

- Set learning count to at least 30 counts (targeted count) - assuming a continuous monitoring test program is used.
- Check increase target by 2 acquisitions for every day up to a maximum total of around 60 traces.
- Check start a new cycle and program the date at which you expect link to start experience significant variations due to, for example, colder temperature at night or rainy season.
- At the reset date, learning will reset and 30 new measurements will take place, creating a new set of statistical thresholds in one or few hour's maximum. Each day over the two following weeks, two other acquisitions will be added to cumulate a total of 60 acquisitions.
- From that point on, all thresholds limit will apply around new average values.

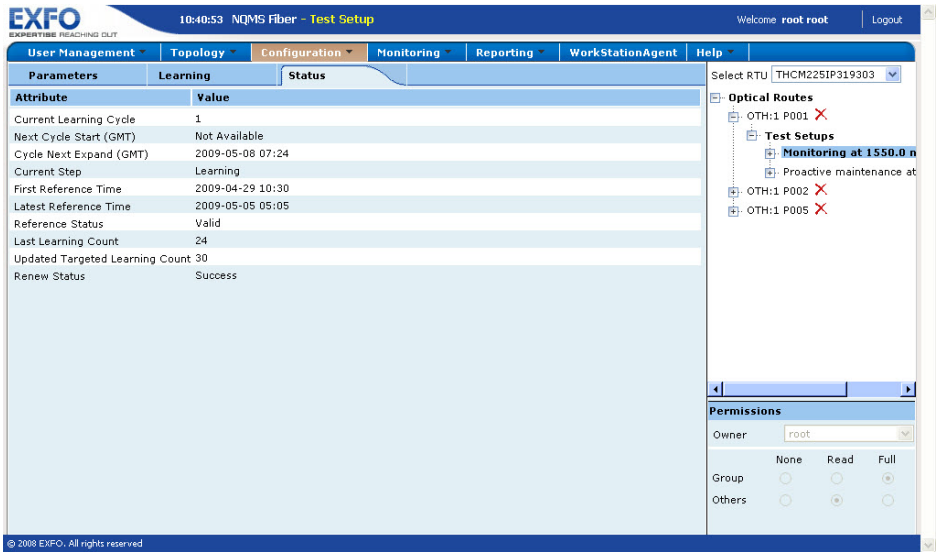
Note: *If you want to refresh this page you have to click the refresh button from the browser, after refreshing, it will display the Optical Route management list page. Expand the Optical Route and select the respective test setup to see the updated status.*

Viewing Status

The Status window displays the status of various attributes of the test setups in a brief format.

To view the status:

1. From the **Configuration** menu, select **Optical Routes**.
2. Select the optical route for which you have to view the status.
3. From the tree view, select **Test Setups**.
4. From the tree view, select the test setup for which you want to view the status.
5. Click the **Status** tab.

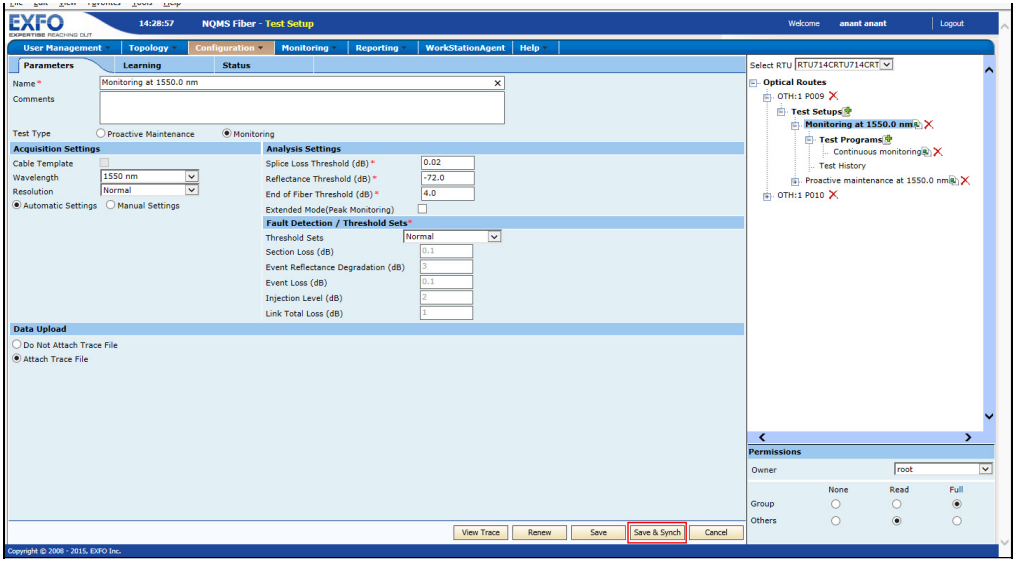


The following attributes are displayed:

- **Current cycle**: number of current cycle of the test setup.
- **Next Cycle Start (GMT)**

- **Cycle Next Expand (GMT)**
- **Current Step**: current step for the test setup.
- **First Reference Time**: time of the first reference in the first learning cycle.
- **Latest Reference Time**: time of the latest reference in the most recent learning cycle.
- **Reference Status**: displays the status of the test setup. The status can be valid, invalid, or valid but distance not fully covered.
- **Last Learning Count**: count of the last learning cycle.
- **Upgraded Target Learning Count**: displays total number of targeted counts per cycle.
- **Renew Status**: displays the status of the test parameters after they are renewed for a new test setup. Initially the status is displayed as scheduled and after it is renewed successfully, the status is displayed as success or failure.

Partial Synchronization on the Test Setup Page

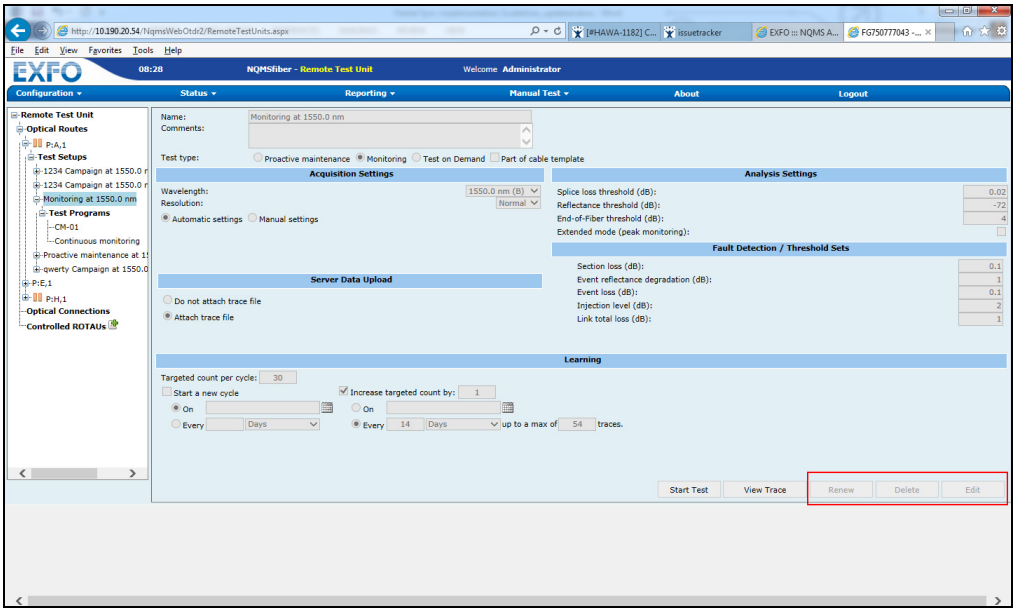


- When you add/edit **Test Setup**, the following 2 option-buttons are available to save the changes:
  - **Save** only saves the updated data to the EMS database.
  - **Save & Sync** saves the updated data to the EMS database and initiates a partial synchronization for the selected RTU.
- For **Save & Sync**, all previous and newly-added data related to **Optical Route**, **Test Setup**, and **Test Program** will be synced to the specific RTU.

Supporting Partial Synchronization Changes for the RTU-720/750

- The **Add**, **Delete**, and **Edit** functions will be disabled from the RTU **Test Setup** page when connected online with the EMS.
- In **Test Setup**, the **Renew** functionality will be disabled from the RTU when connected online with the EMS.

Note: *In **Test Setup**, the **Add**, **Delete**, **Edit**, and **Renew** functions will remain enabled in FG mode.*

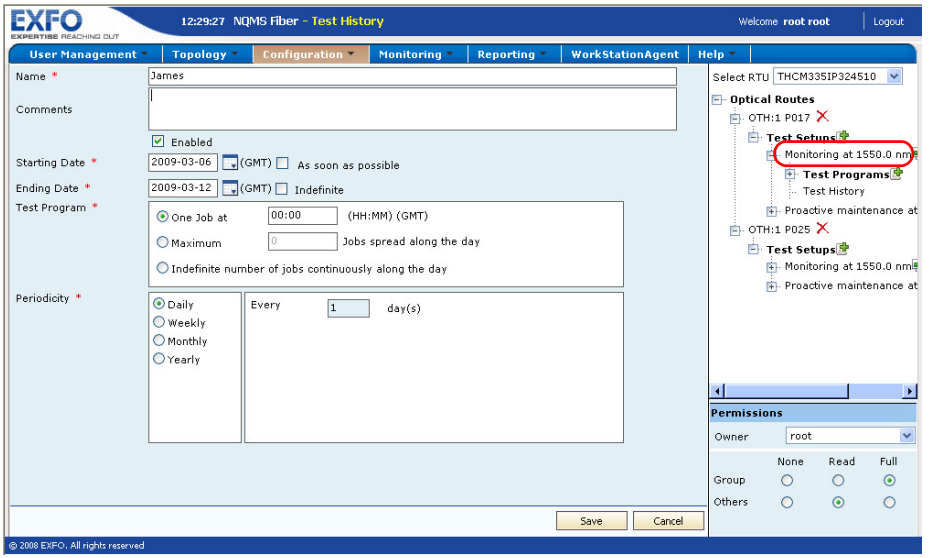


Managing Test Programs

Each test setup can be scheduled to run tests according to its test programs. Different test programs can run the tests using different time patterns. However, you have to specify the maximum number of jobs for each day that the test program must run because if there are many test programs for an RTU, it may not be able to schedule all requested jobs of all test programs, due to the lack of time.

To add a test program:

1. From the **Configuration** menu, select **Optical Routes**.
2. Select the optical route for which you have to add the test program.
3. From the tree view, select **Test Setups**.
4. From the tree view, select the test setup for which you want to add a test program.
5. From the test programs list, click .



6. Fill out the required information:

- **Name**: the name of the test program is mandatory. You cannot leave it blank.
- **Comments**: enter the comment.
- **Enabled**: select this check box if you want the RTU to run (schedule) this test program. The RTU does not schedule test programs that have been disabled.
- **Starting Date**: select the first day from which the test program must run. If the **As soon as possible** check box is selected, the RTU will schedule the test program immediately after the next synchronization.
- **Ending Date**: select the day on which the test program must end. If the **Indefinite** check box is selected, the application runs the test program forever, overriding the ending date.
- **Test Program**: select the required daily test program. When there are multiple jobs scheduled, the application performs the test program in the following order:
  - **One Job**: select this option to run only one job each day when the test program runs. You can specify the exact time of the job.
  - **Maximum**: to run a specific number of jobs each day the test program runs. It is possible that due to the priority rules designed on the RTU, a job may not be executed. For example, for a 24 jobs per day, it is possible a job is not executed because a higher priority job is running at the scheduled slot for this test program. High priority jobs are for example, ad-hoc tests on the RTU, test-on-demand or a job that is scheduled for daily execution at a given hour each day. There is only one OTDR per RTU and its access is shared among users and all test set ups. Monitoring test set ups, with “continuously during the day” programs have the lowest priority. If you need jobs to be executed, for every 30 min or every hour, you may create as many test programs with “Daily”

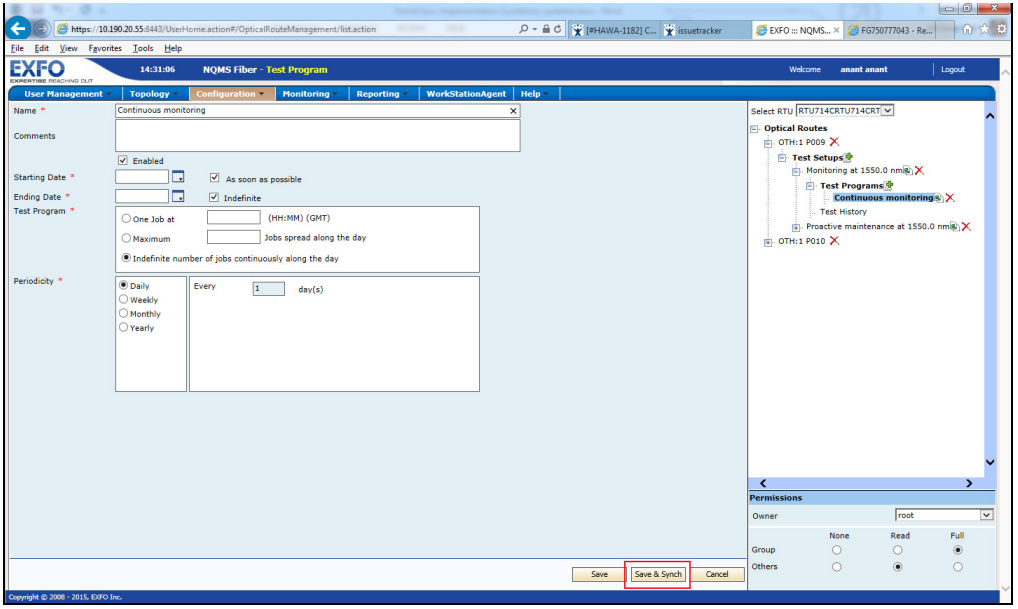
type specifying the different times requested for each. Note that, if you do this for multiple ports, and if you perform testing at same time of the day on two ports, then one will be dropped.

- **Indefinite number of jobs running continuously along the day:** select this option to run as many jobs as the system can. The final number of jobs will depend on the other test programs that have to be run by the same RTU.

- **Periodicity**: the periodicity of the test program defines the reoccurrence of the daily test program. You can select any one of the following:
  - **Daily**: to repeat the test program on a daily basis, according to the frequency set.
  - **Weekly**: to repeat the test program on a weekly basis, according to the frequency set. In addition, you can select the required days of the week (Monday to Sunday) when the test program should run.
  - **Monthly**: to repeat the test program on a monthly basis, according to the frequency set. In addition, you can either enter a date or select a specific day of the month when the test program should run.
  - **Yearly**: to repeat the test program on a yearly basis, according to the frequency set. In addition, you can either enter or select a specific day of the month when the test program should run.

7. Click **Save** to apply your changes, or **Cancel** to discard them.

Partial Synchronization on the Test Program Page

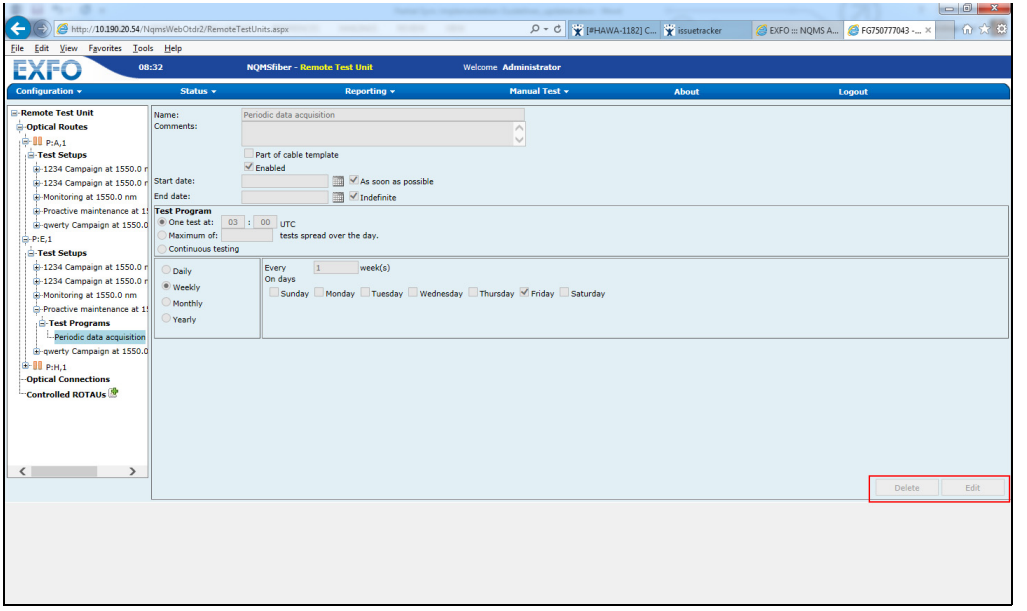


- When you add/edit **Test Program**, the following 2 option-buttons are available to save the changes:
  - **Save** only saves the updated data to the EMS database.
  - **Save & Sync** saves the updated data to the EMS database and initiates a partial synchronization for the selected RTU.
- For **Save & Sync**, all previous and newly-added data related to **Optical Route**, **Test Setup**, and **Test Program** will be synced to the specific RTU.

Supporting Partial Synchronization Changes for the RTU-720/750

The **Add**, **Delete**, and **Edit** functions will be disabled from the RTU **Test Program** page when connected online with the EMS.

Note: *In **Test Program**, the **Add**, **Delete**, **Edit**, and **Renew** functions will remain enabled in FG mode.*

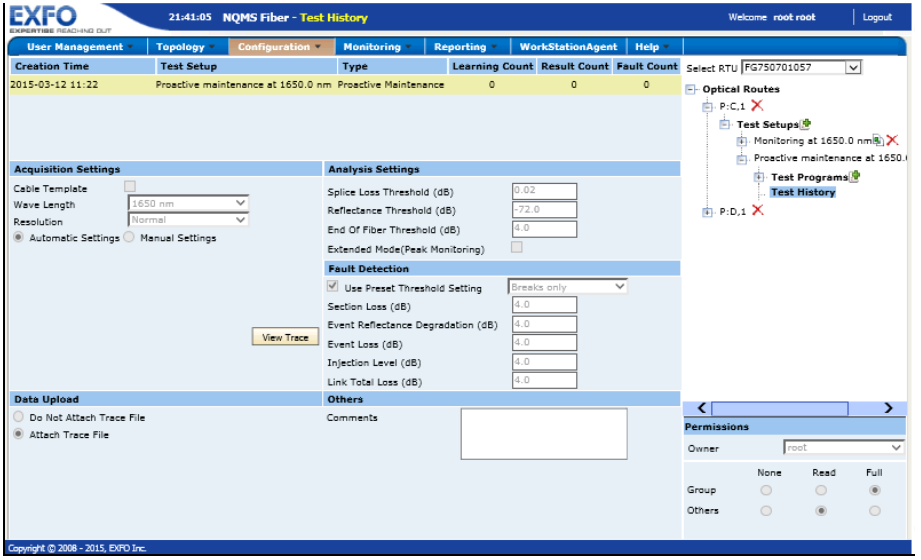


Understanding the Test Setup History

Each time you renew a test setup (any change in test setup measurement settings or explicit renewal request), its previous settings and all its reference data is archived. You can view the archived test setups in the test setup's history, located right under the test setup you select.

To view the test history:

1. From the **Configuration** menu, select **Optical Routes**.
2. Select the optical route whose test history you want to view.
3. Select the test setup for which you want to check the test history.
4. From the tree view, select **Test History**.



The history window displays the following data for each archived test setup:

- **Creation Time**: time at which the history item was created and when the test setup was archived due to a renew action.
- **Test Setup**: name of the test setup.
- **Type**: type of test setup.
- **Learning Count**: number of learning cycles.
- **Result Count**: number of results generated.
- **Fault Count**: number of faults encountered.

In addition, it displays information about acquisition settings, analysis settings, fault detection, and data upload.

6 Receiving and Processing Alarms

NQMSfiber alerts you when certain events or combinations of events occur. NQMSfiber generates alarms with the help of predefined templates called *alarm types*. You can also create your own alert types. You can modify and delete any alert type, including those that were created at time of installation.

Alarm Types

It is possible to create fiber fault alarm only in particular cases (for example, break type or event loss degradation more than 2 dB) but that all the fault events, defined by the fault detection threshold of a test set-up (see Modifying Fault Detection Threshold *on page 137*), will be uploaded and accessible through the result browser (see Viewing Results with the Result Browser *on page 163*). Alarms are created on the basis of three severity conditions, which are:

- **Low Severity Condition**: the malfunction or error is not threatening. You can overlook such a condition momentarily as it may not require immediate attention.
- **Medium Severity Condition**: the malfunction or error presents no harm to the current working condition, but it can lead to damages if nobody attends to it within a specific time.
- **High Severity Condition**: You must attend to the problem immediately to avoid major damage or losses.

RTU System Statuses

The following statuses are supported in EMS for the RTU-720 and FG-750.

Alarm Type	Values
3G/4G Status*	Examples are: NONE, ACTIVATING, ACTIVATED, DEACTIVATING, DEACTIVATED
CPU/System Temperature*	0 to 100 Celsius
Available RTU system memory percentage*	0 to 100 %
Power supply*	OK, DEGRADED
System fan RPM*	OK, DEGRADED, FAIL.
Available percentage of disk space*	0 to 100 %
OTDR temperature	Measured in Celsius or Fahrenheit
OTDR Status*	0: unavailable, 1: available
ROTAU Status*	0: normal, 1: unreachable, 2: decoupled, 3: unreachable & decoupled

* RTU FG-750 only

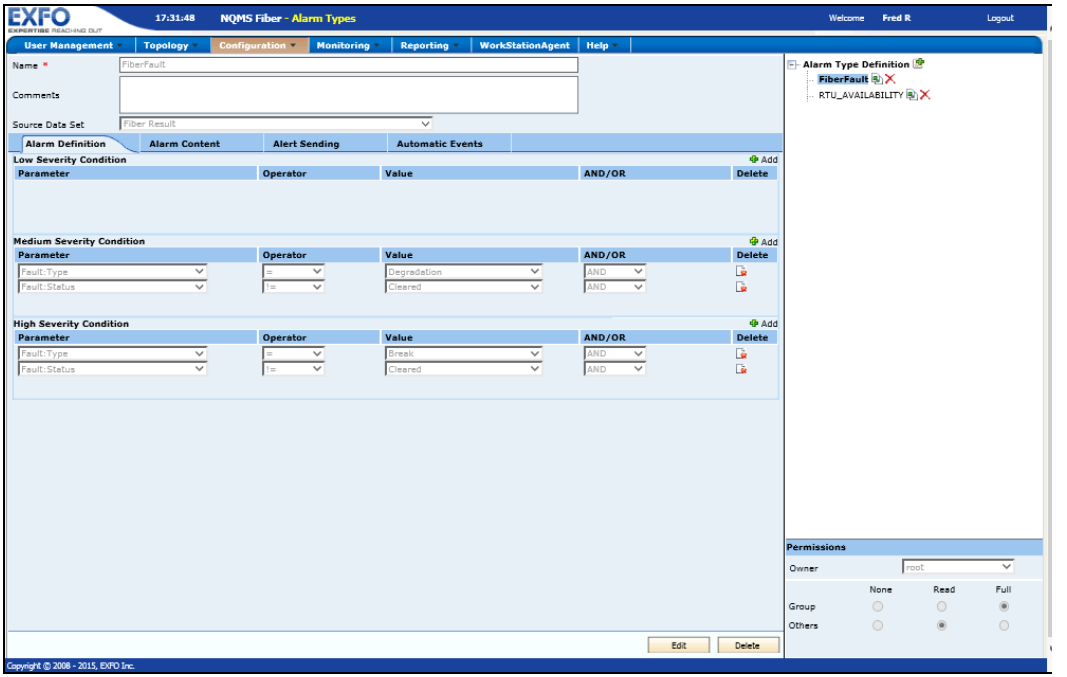
Adjusting Alarm Severity Based on Logical Operators

You can specify conditions using mathematical operators. Whenever the criteria of such a condition is met, the system generates an alarm. For example, to generate an alarm when there is a RTU communication failure, you can specify a condition as follows:

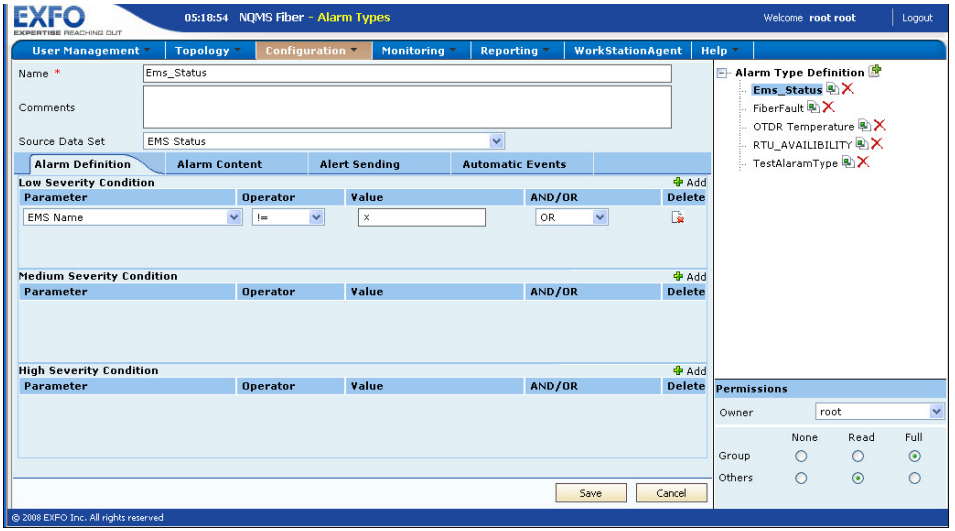
Conditions	Values
Parameter	EMS: RTU Status
Operator	(=)
Value	Not Reachable

To add an alarm type:

1. From the **Configuration** menu, select **Alarm Types**.



2. From the **Alarm Type Definition**, click .



3. Fill out the required information:

   - **Name**: enter the name.
   - **Comments**: enter the comments.
   - **Source Data Set**: set of data parameters used for alarm definition that measure an event with reference to the settings to take a decision whether to generate an alarm or not.

4. In the **Alarm Definition** tab, set the alarms on the basis of low, medium and high severity conditions. For example, on defining a fiber fault alarm for medium severity condition for a Customer ABC, you can specify the conditions as shown in the example below:

Conditions	Values
Parameter	Select **Fault**:**Affected Customers**
Operator	Select (**=**) operator
Value	Select **CustomerABC**
AND / OR	Select **AND**

The logical operators compare Boolean expressions and return a Boolean result.

In EMS following logical operators are used.

- **AND**: The **AND** operator performs logical conjunction on two Boolean expressions. That is, if both expressions evaluate to True, then the And operator returns True. If either or both expressions evaluate to False, then **And** returns False.
- **OR**: The **OR** operator performs logical disjunction on two Boolean expressions. If either expression evaluates to True, OR returns True. If neither expression evaluates to True, **OR** returns False.
- **XOR**: The **XOR** operator performs logical exclusion on two expressions. If either expression evaluates to True, but not both, **XOR** returns True. If both expressions evaluate to True or both expressions evaluate to False, **XOR** returns False.

Precedence of logical operator

NOT - High

AND - Medium

OR - Low

When expressions are mixed with **AND**, **OR** logical operator that evaluation must be done in the correct order. Parentheses can be used to group operands with their correct operator, just like in arithmetic. Also like arithmetic operators, logical operators have precedence that determines the things that are grouped in the absence of parentheses.

In an expression, the operator with the highest precedence is grouped with its operand(s) first, then the next highest operator will be grouped with its operands, and so on. If there are several logical operators of the same precedence, they will be examined left to right.

For Example,

AND Logical Operator:

In above figure, there are two conditions:

- Condition 1: **Fault:Type = Break AND**
- Condition 2: **Fault:Status!= Cleared AND**

In this case, if both conditions are true then result will be true and if one of the conditions is false then result is false.

Note: *At the end of the condition 2,* ***AND*** *operator will be neglected or it will not be added in the expression.*

OR Logical Operator:

In the above figure, there are three conditions:

- Condition 1: **Fault:Type = Break AND**
- Condition 2: **Fault:Status!= Cleared OR**
- Condition 3: **Fault:Threshold Type = Event Loss AND**

In this case, Condition 1 and 2 will be evaluated first because precedence of **AND** operator is High. The result of this condition will be evaluated with condition 3, that is (condition 1 and condition 2) **OR** (condition 3).

Note: *At the end of Condition 3, **AND** operator will be neglected or it will not be added in the expression.*

XOR Logical Operator:

In the above figure, there are three conditions:

- Condition 1: **Fault:Type = Break AND**.
- Condition 2: **Fault:Status! = Cleared XOR**.
- Condition 3: **Fault:Nearest Site = s2 AND**.

In this case, Conditions 1 and 2 use **AND** logical operator and result in being checked with Condition 3 using **XOR** logical operator.

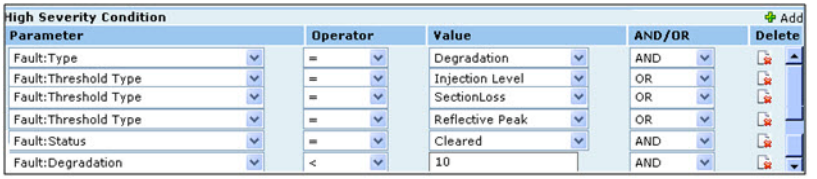
For **AND** operator the result will be true if both conditions are true, and false if one of the conditions is false.

For **XOR** operator, the result will be false if both conditions are true and if both conditions are false. If one of the conditions is true then result will be true.

(Condition 1 AND Condition 2) **XOR** Condition 3)

Note: *At the end of Condition 3, **AND** operator will be neglected or it will not be added in the expression.*

For example,



In the above figure, there are six conditions:

- Condition 1: **Fault:Type = Degradation AND**.
- Condition 2: **Fault:Threshold= Injection Level OR**.
- Condition 3: **Fault:Threshold = Section Loss OR**.
- Condition 4: **Fault:Threshold = Reflective Peak OR**.
- Condition 5: **Fault:Status = Cleared AND**.
- Condition 6: **Fault:Degradation = 10 AND**.

Below are the expressions of the above six conditions:

Parentheses should be used to group operands with their correct operator but in EMS UI parenthesis are not displayed so the above example will look as shown below:

(Condition 1 **AND** Condition 2) **OR** Condition 3 **OR** condition 4 **OR** (Condition 5 **AND** Condition 6).

Step 1: In above expression, **AND** operator have high precedence so it will be evaluated from left to right.

Example: Result 1 = (Condition 1 **AND** condition 2).

Step 2: Next Condition 5 and Condition 6 will be evaluated.

Example: Result 2 = Condition 5 **AND** Condition 6.

Step 3: After the Result 2, Next step will be Result 1 with Condition 3 using **OR** operator.

Example: Result 3 = Result 1 **AND** Condition 3.

Step 4: After the Result 3, Condition 4 will be evaluated.

Example: Result 4 = Result 3 **OR** Condition 4.

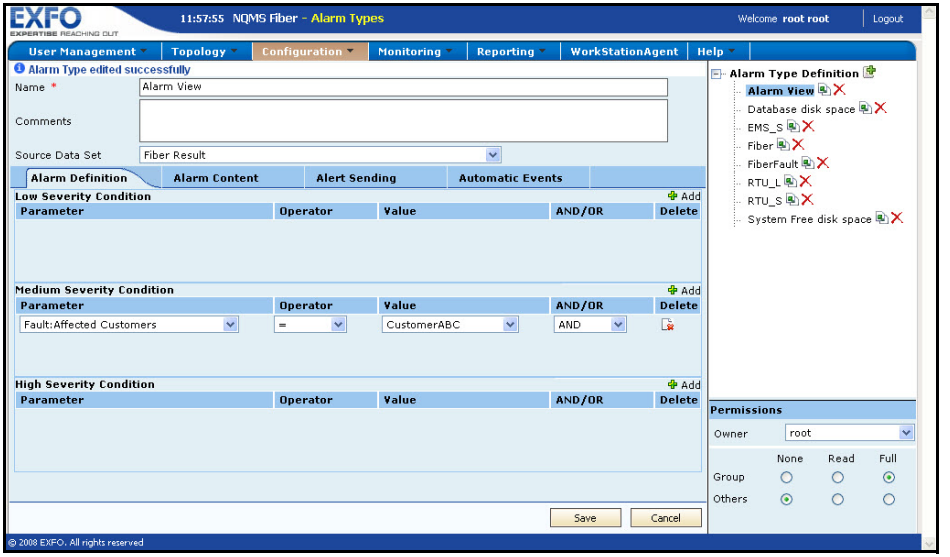
Step 5: At last Result 4 will evaluated with Result 2.

Example: Result 5 = Result 4 **OR** Result 2.

Note: *At the end of Condition 6, **AND** operator will be neglected or it will not be added in the expression.*

Note: *You can select the* *icon to delete an alarm definition.*

5. Click **Save** to apply your changes, or **Cancel** to discard them.



Note: *While configuring a new alarm, you need to configure details under the* ***Alarm Definition****,* ***Alarm Content****,* ***Alert Sending****, and* ***Automatic Events*** *tabs. For more information on alarm definition, see Adjusting Alarm Severity Based on Logical Operators* on page 103*. For more information on alarm content, see Configuring the Primary and Secondary Grouping* on page 112*. For more information on alert sending, see Configuring Alarm Notification* on page 116*. For more information on automatic events, see Configuring Automatic Events* on page 119*.*

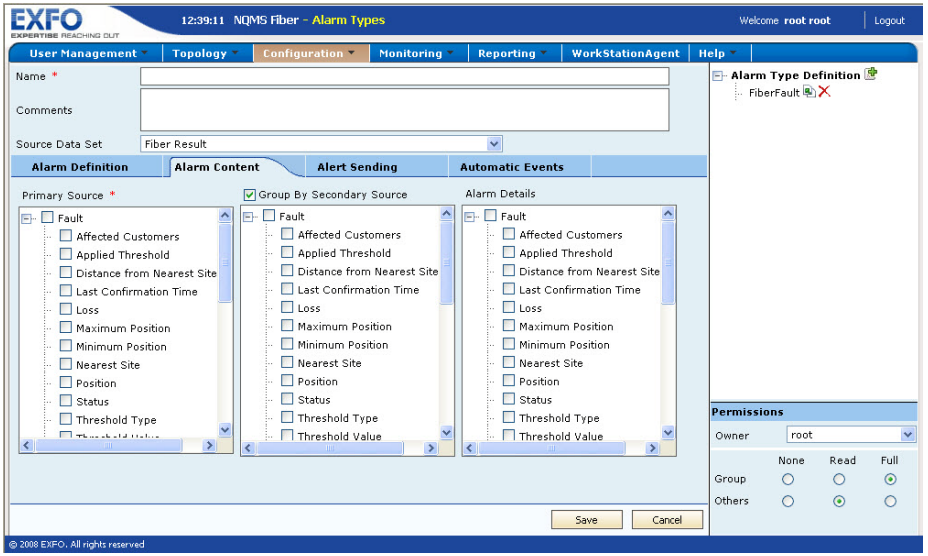
Configuring the Primary and Secondary Grouping

You can specify a primary and secondary source to group alarms with identical conditions.

- **Primary Source**: refers to the primary conditions on which the alarm is generated. An alarm is displayed in the alarm monitoring view with its primary source at the left. It can be defined in alarm type as any field related to the dataset used for defining the alarm. In case of fiber fault, you can use optical route name, a combination of RTU name and port number, an affected user or a combination of fields which makes it easy for the users to identify main alarm source.
- **Secondary Source**: refers to the secondary conditions on which the alarm is generated. If secondary grouping is defined for the alarm type, the system groups alarm of an alarm type based on secondary grouping conditions. Secondary grouping helps to reduce the number of primary alarms for particular cases where the same root creates secondary alarms. In case a new alarm condition exist, but has the same primary source than an opened alarm, a second source added event will be created, and a new alarm event will be added in the group of secondary level alarms. It is useful for grouping multiple fault events generated on the same fiber, by different test set-ups and the same root. This function can also be used to group system alarms under single alarm type. Primary alarm will be resolved only when all secondary events are no longer in alarm condition.

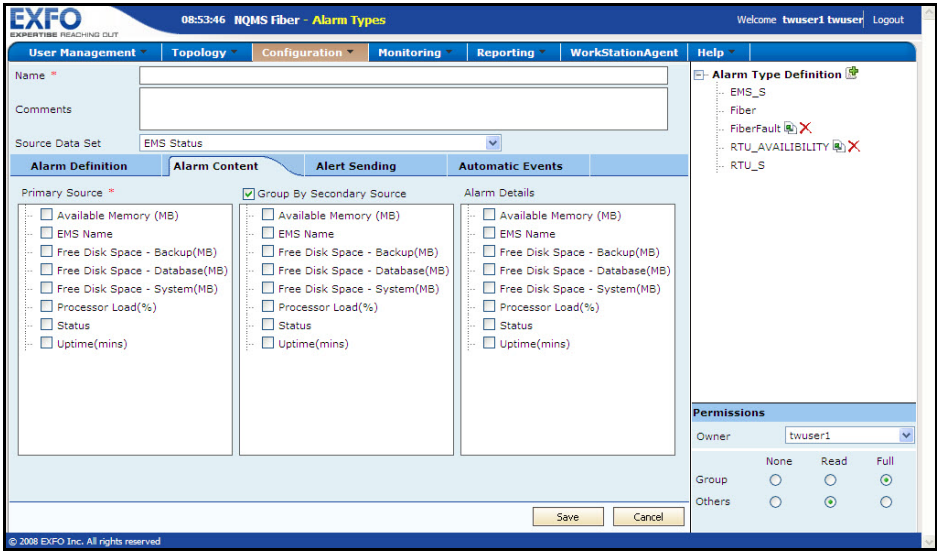
To create an alarm using primary and secondary grouping:

1. From the **Configuration** menu, select **Alarm Types**.
2. From **Alarm Type Definition**, click .
3. Click the **Alarm Content** tab.
4. Click **Edit**.



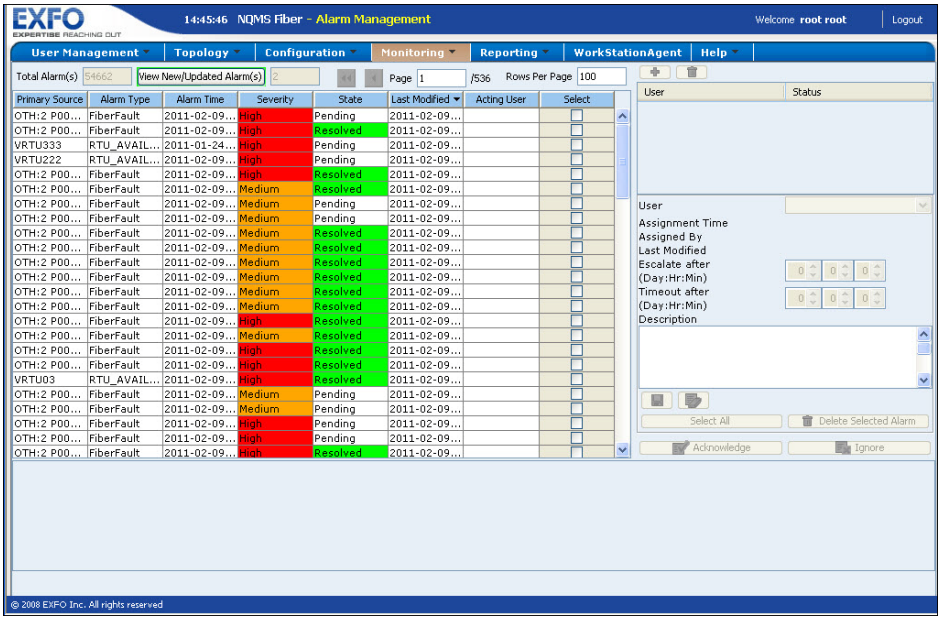
5. From the **Alarm Content** tab, define the alarm on the basis of primary and secondary source. For example, to group alarms of affected customers on the basis of primary source as **Affected Customers** and secondary sources as **Optical Route Name**, **RTU Name**, and **Test Setup Name**, it will group all alarms for affected customer under the same alarm, you can specify conditions as shown in the example below:

Conditions	Values
Primary Source	Affected Customers.
Group by Secondary Source	Optical Route Name, RTU Name, and Test Setup Name.



6. Click **Save** to apply your changes, or **Cancel** to discard them.

7. To view the result of the affected customers, from the **Monitoring** menu, select **Alarms**.

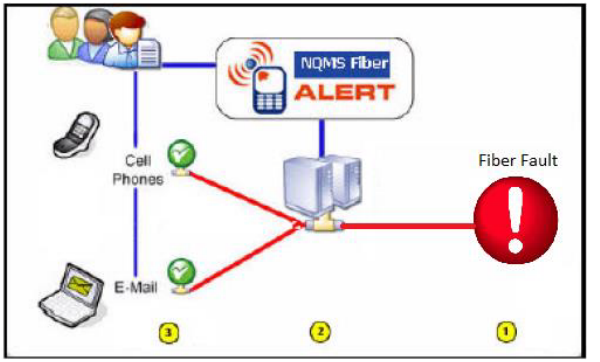


Configuring Alarm Notification

Alerts are notification messages that a user, or a group of users, receive when a new alarm is generated or the status of an existing alarm has changed. You can select the user, or group of users, who will receive these notifications when you create an alarm type. It is always advisable to include multiple users for any alarm notification.

Notifications can be in the form of:

- **E-mail**: the system sends an E-mail to the specified user providing all the details about the problem. The alert would be sent via mail using SMTP protocol.
- **GIS\NIS System**: the system sends a XML e-mail to the specified user alerting him about the alarm.
- **Phones**: the system sends an sms to the specified user alerting him about the alarm.

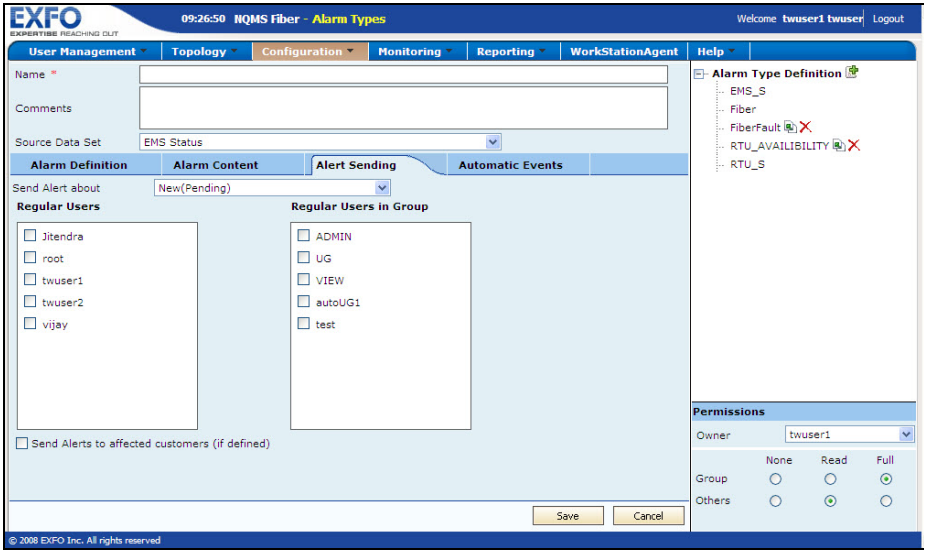


Alerts can be sent for a variety of alarms. You can send alerts for **Active**, **Completed**, or **Pending** alarms. NQMSfiber system also provides an option to alert affected clients in case of any problem.

To configure an alarm notification:

Note: *Ensure that the users with appropriate notification channels are defined at this stage see the Fiber Guardian Management System section.*

1. From the **Configuration** menu, select **Alarm Types**.
2. Click the **Alert Sending** tab.



3. Select the type of alert to be sent. For example, to send alerts for alarms that are either pending, acknowledged or in progress, select **Active (Pending, Acknowledged, In Progress)** from the **Send Alert about** list.
4. To notify users, select the required users from the **Regular Users** list.
5. To notify users belonging a particular group, select the required group from the **Regular Users in Group** list.

Note: *Notification can take the form of an HTML E-mail, small size or detailed, an XML email (GIS) or short messaging service (sms) through the GSM modem.*

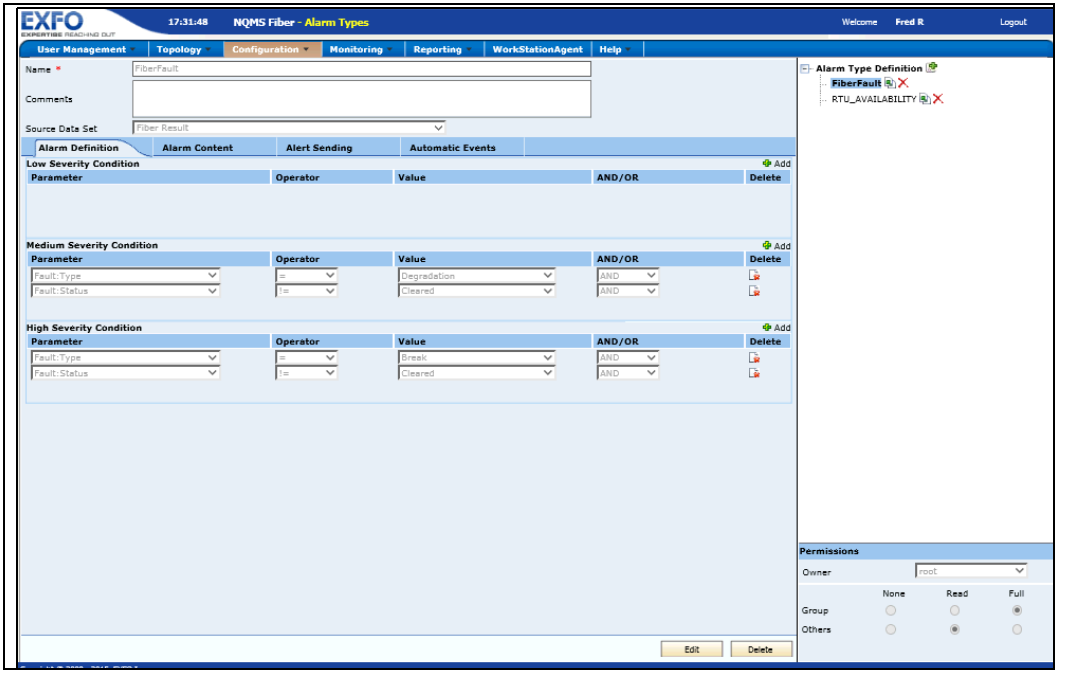
6. To send alerts to affected customers, select **Send Alerts to affected clients** check box (if defined). Customer must be defined in the user creation menu and has to be associated to a specific route (in case of without OSPInSight) or to a specific section of a route (in case of with OSPInSight implementation).
7. Click **Save** to apply your changes, or **Cancel** to discard them.

Configuring Automatic Events

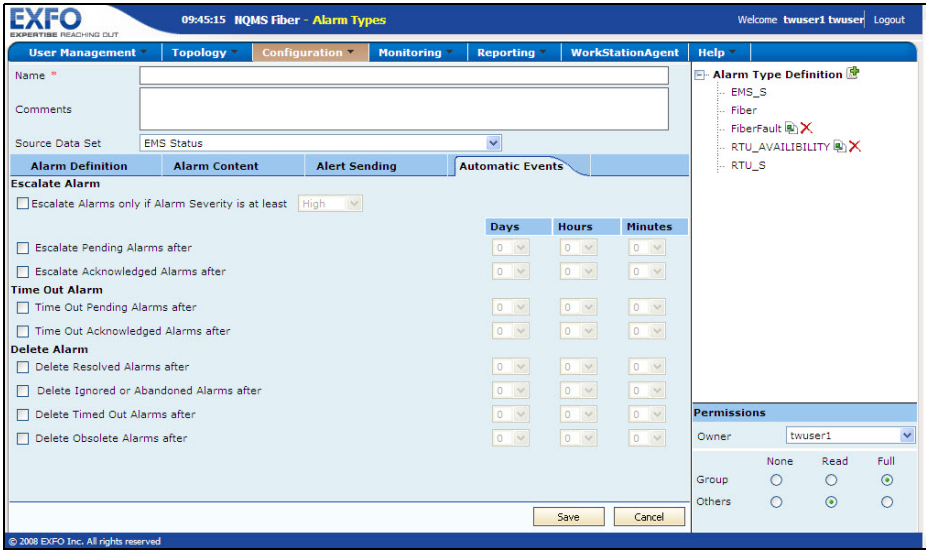
Automatic events are a set of actions that will be performed automatically in response to alarms. You can specify the number of days, hours and minutes after which the automatic events will be performed.

To configure automatic events:

1. From the **Configuration** menu, select **Alarm Types**.



2. Click the **Automatic Events** tab.



3. Configure any of the following automatic events:

Action	Steps
To escalate the alarm of a particular severity	Select the **Escalate Alarms only if Alarm Severity is at least** check box. Select the severity type from the list. For example, select **Medium**.
To escalate pending alarms	Select the **Escalate Pending Alarms after** check box. Select the days, hours or minutes from the respective lists.
To escalate acknowledged alarms	Select the **Escalate Acknowledged Alarms after** check box. Select the days, hours or minutes from the respective lists.
To time out pending alarms	Select the **Escalate Pending Alarms after** check box. Select the days, hours or minutes from the respective lists.
To time out acknowledged alarms	Select the **Escalate Acknowledged Alarms after** check box. Select the days, hours or minutes from the respective lists.
To delete resolved alarms	Select the **Delete Resolved Alarms after** check box. Select the days, hours or minutes from the respective lists.
To delete ignored or abandoned alarms	Select the **Delete Ignored or Abandoned Alarms after** check box. Select the days, hours or minutes from the respective lists.
To delete timed out alarms	Select the **Delete Timed Out Alarms after** check box. Select the days, hours or minutes from the respective lists.

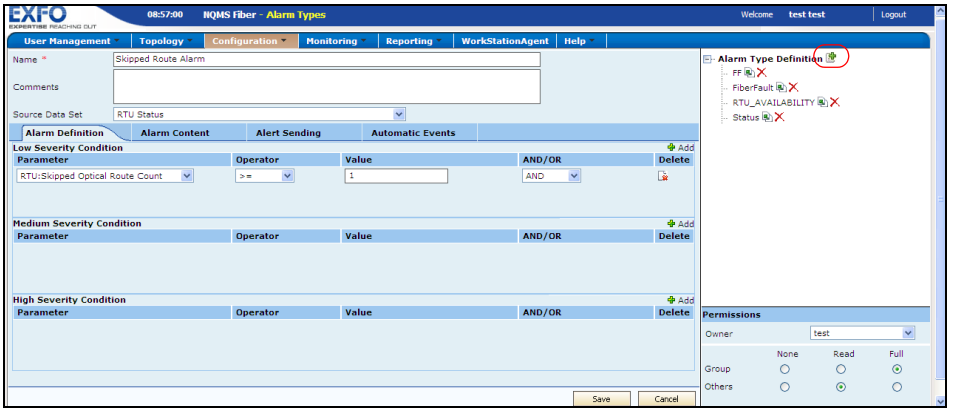
4. Click **Save** to apply your changes, or **Cancel** to discard them.

Configuring Optical Route Alarms (Skipped State)

You can configure skipped state alarms for degraded fibers. Whenever the criteria of such a condition is met, the system generates an alarm.

To add a skipped route alarm:

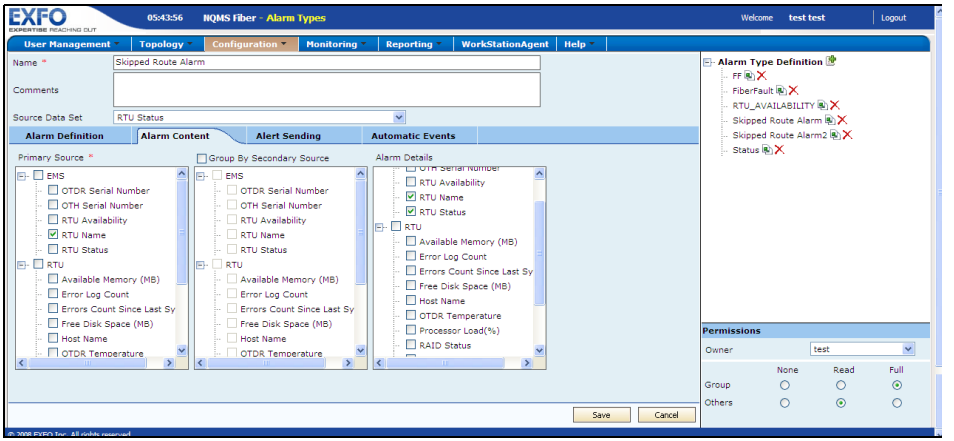
1. From the **Configuration** menu, select **Alarm Types**.
2. From the **Alarm Type Definition**, click .



3. Fill out the required information:
   - **Name**: enter the name of the alarm.
   - **Comments**: enter the comments to describe the alarm.
   - **Source Data Set**: Select the source of the data used to detect alarms. In the case of a skipped state alarm, the source should be **RTU Status**.
4. In the **Alarm Definition** tab, set the alarms on the basis of low, medium and high severity conditions. Select **Parameter** as **RTU:Skipped Optical Route Count**. See *Adjusting Alarm Severity Based on Logical Operators* on page 103.

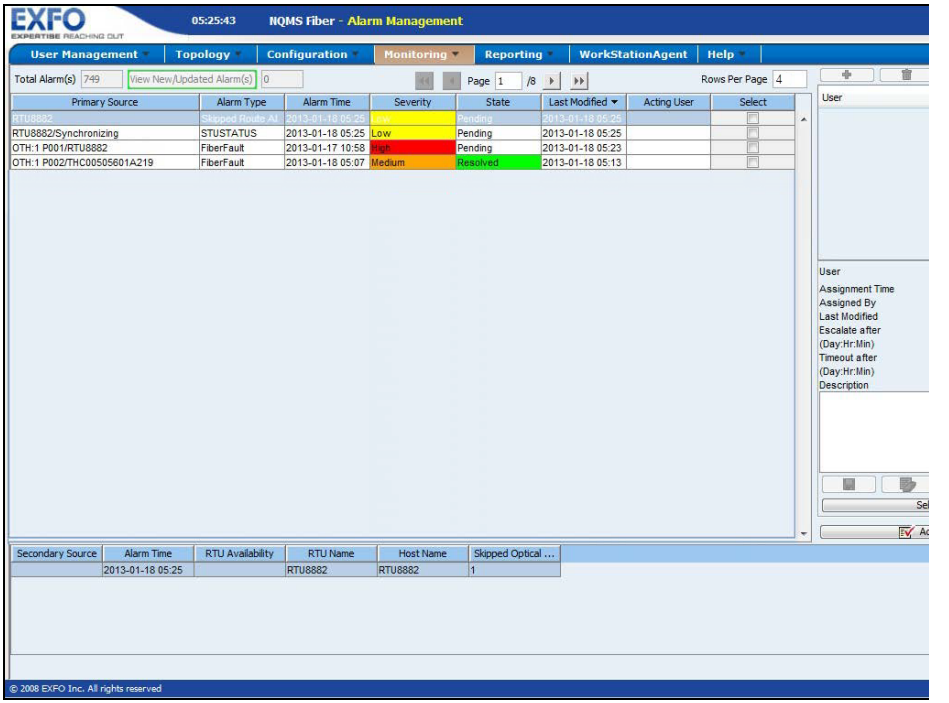
5. From the **Alarm Content** tab, define the alarm on the basis of primary and secondary source.

6. From the **Alarm Details**, select the required parameters for which you want to get detailed information in optional columns.



7. Click **Save** to apply your changes, or **Cancel** to discard them.

8. To view the result of the affected customers, from the **Monitoring** menu, select **Alarms**.

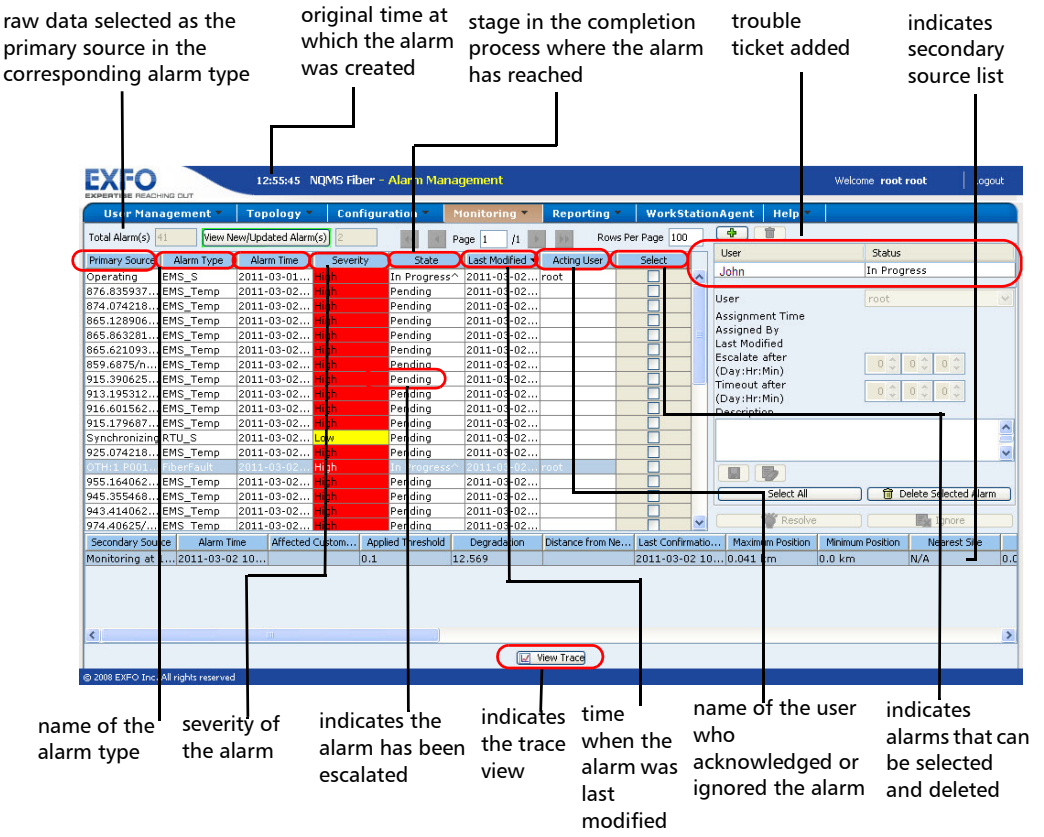


Viewing Alarms

From the alarm window you can examine and manage alarms. You can define alarm rules for various alarm types. The NQMSfiber system triggers an alarm and sends an alert to users if the alarm conditions are met. If these users are logged on, they will receive a notification message on their workstations.

To view an alarm:

1. From the **Monitoring** menu, select **Alarms**. The alarms window is displayed.



Generated alarms initial state shows as pending, if you set an automatic events for that particular alarm type, then the alarm state changes accordingly. If you belong to the same region in which the RTU is present, then any of the users belonging to the region where the RTU is present can acknowledge or ignore the pending alarms.

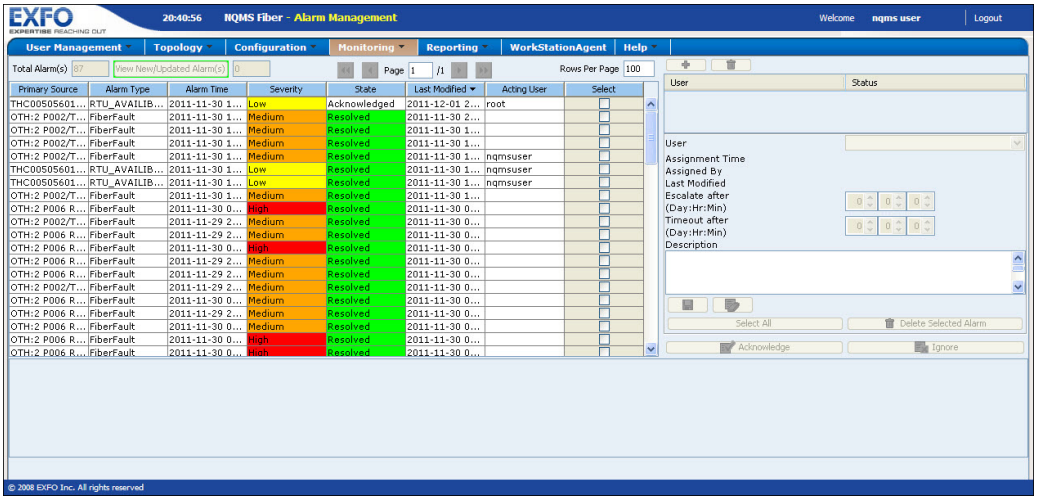
The alarm list on the left side of the window contains a row for each alarm. The table columns list the alarm attributes as shown in the figure above. You can sort the alarm list by any of the column by selecting the header of the column.

The Alarm type window also defines whether an acknowledged alarm needs further management such as creating a trouble ticket or escalating the alarm. The alarm management displays the alarms and their status parameters in a report table. Select an alarm and on the right side of the view, create and assign a ticket to a system user. Adding a note to the ticket will be stored as part of the alarm history. Once a ticket is created, it can be escalated and /or timed out after a specified delay. Multiple tickets can be created for the same alarm. Only system and ticket assignees can resolve an alarm for which a ticket has been opened. Tickets, when saved, send an email with Trouble Ticket Added in the email header with all alarm details. The Alarm Details panel (at the bottom of the window) contains a detailed description of the alarms. When you select any alarm, the alarm details are displayed in the Alarms Details panel.

Entering a Trouble Ticket

The user who acknowledges the alarm may assign a trouble ticket to another user.

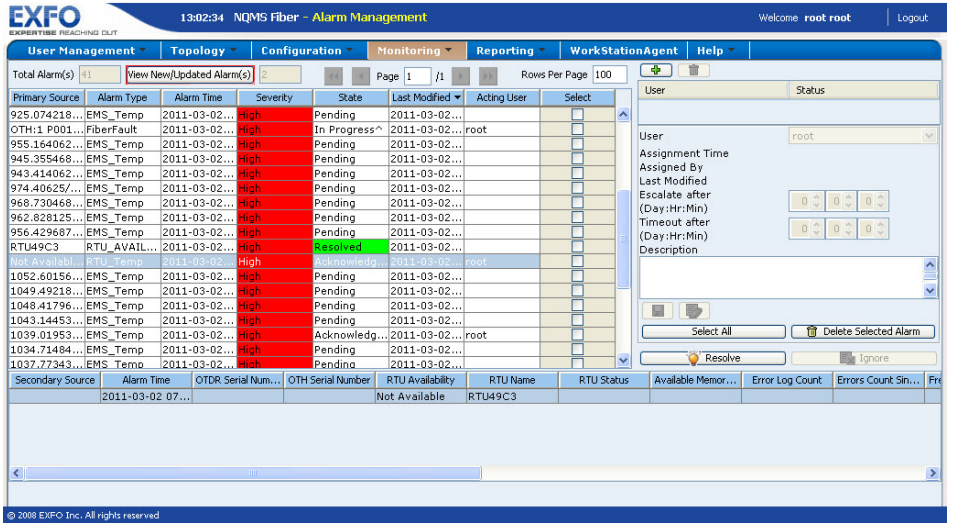
1. From the **Monitoring** menu, select **Alarms**.



2. Select the **Pending** state.

3. click Acknowledge.

   The **Pending** state changes to **Acknowledged**.



4. Click .

5. Select the **User** to whom the trouble ticket is to be assigned.

The system displays the assignment time, assigned by and last modified properties automatically in the alarm management panel on the right of the window.

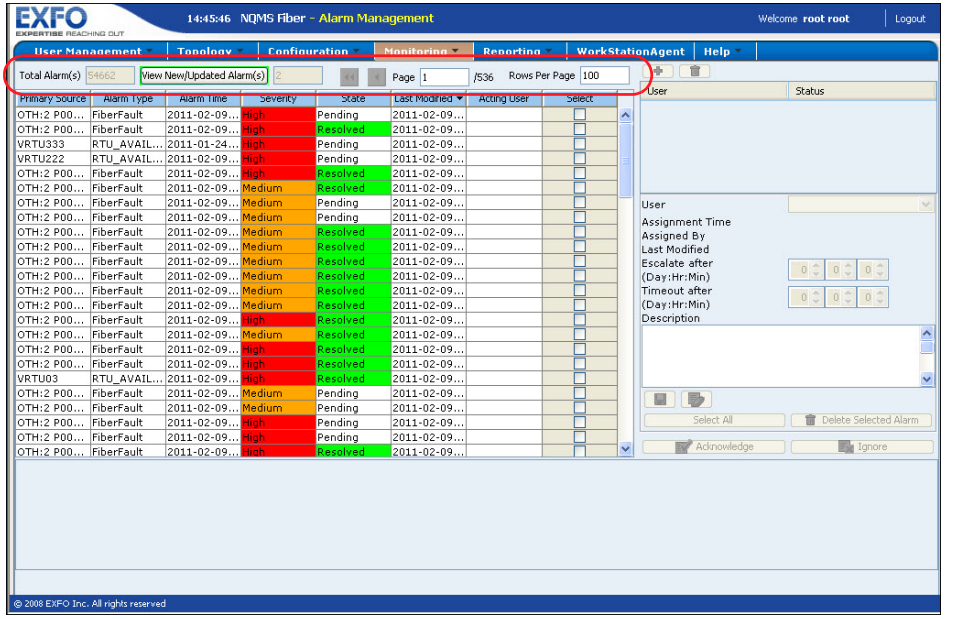
Additional settings including **Escalate after** and **Timeout after** define the deadline within which the trouble ticket shall be either resolved or ignored. The state of the alarm changes once its last trouble ticket becomes either resolved or ignored.

6. Click to apply your changes, or to clear trouble ticket.

Note: *The severity status of the resolved alarms appear in green color in the user interface.*

The Alarm Navigation Panel

The alarm navigation panel allows you to check and manage alarms. The alarm list contains a row for each alarm. By default, the number of rows displayed per page are 100. You can enter between 1-999 rows to be displayed per page. The **Alarm Management** page displays the cumulative number of alarms, that is new alarms and existing list of alarms.

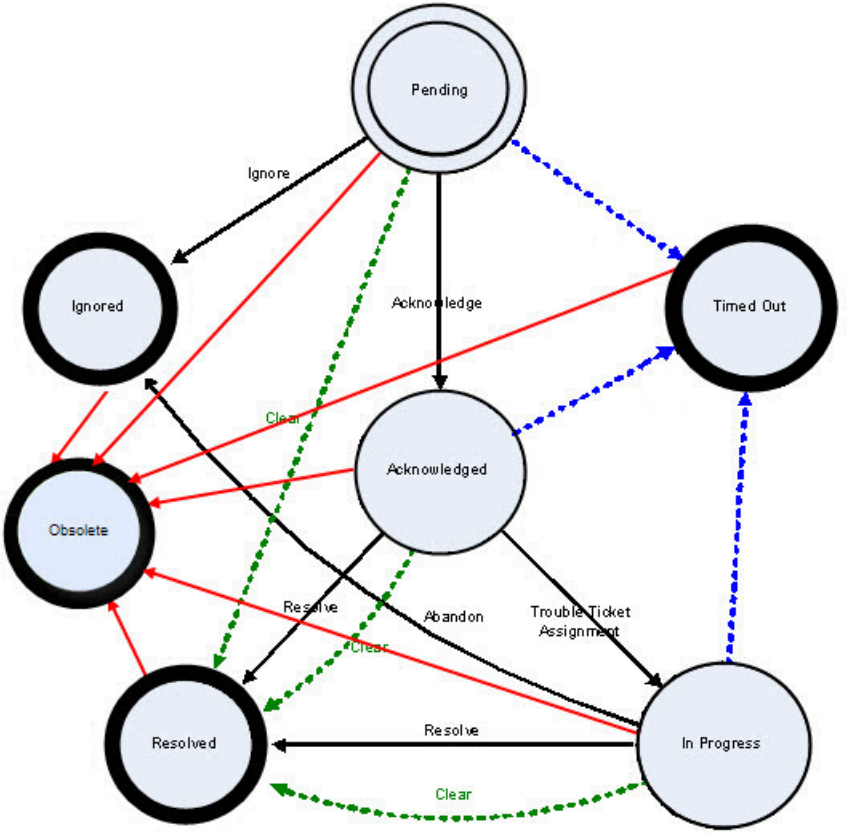


Components	Description
Total Alarm(s)	Displays the total number of alarms which is updated when new alarms are generated or existing alarms are deleted. The count of **Total Alarm(s)** is updated when you click **View New/Updated Alarm(s)**. The new or updated alarms are added to the total alarms count. This is a non-editable field.
View New/Updated Alarm(s)	To view the new or updated alarms, click **View New/Updated Alarm(s)**. The **View New/Updated Alarm(s)** button blinks for each generated alarm. The **View New/Updated Alarm(s)** text field only displays the number of new alarms generated. The first page of the **Alarm Management** page displays the newly generated alarms. When you click the **View New/Updated Alarm(s) button**, the first page of alarm management is displayed. The **View New/Updated Alarm(s)** button is disabled when you view the alarm details and is enabled when a new alarm is generated. The new alarms are displayed with default sort order as date and time. The **View New/Updated Alarm(s)** button is green and disabled when there are no new alarms. This button blinks in red and green when a new alarm is generated.
	To view the first alarm page, click the First Page icon. This button is disabled if you are viewing the first page of alarm details. By default, the first page of alarm details is displayed when you log on.

Components	Description
	To view the previous alarm page, click the Previous Page icon. This button is disabled for the first page alarm details.
	To view the next alarm page, click the Next Page icon. This button is disabled for the last page of alarm details.
	To view the last page, click the Last Page icon. This button is disabled for the last page of alarm details.
Page	To view a page, enter the page number in the **Page** field and press **Enter**. You can view the page number of the alarms that is currently displayed (X) and the total number of pages with alarms (Y). (For example, Page X/Y) If you enter a page number less than or greater than existing number of alarm pages, an error message is displayed. You can only enter positive integer values.
Rows Per Page	Displays the number of rows to be displayed per page. You can set the number of rows to be displayed per page. By default, the number of rows displayed per page is 100. You can enter between 1-999 rows to be displayed per page. If you log off after changing the value for the number of rows per page and log on again, then the default number of rows is reset to100.

Taking Care of Alarms

Alarms flow through a complex process from the time they are generated and to the time they are complete. The alarm completion process is illustrated below.



Alarm flow Indicator	Description
	Possible users allowed transition
	System clear possible events
	Automatic transitions based on alarm type rule
	Hardware replacement

- **Pending Alarms**: When an alarm is generated, you are notified about the alarm through an alert.
- **Ignored Alarms**: Initially the status of the alarm is set to pending. If the you choose to ignore the alarm, the completion process ends.
- **Resolved Alarms**: When you acknowledge the alarm which requires no further trouble ticket to be assigned, its status is set to resolved, ending the completion process.
- **In Progress Alarms**: If the acknowledged alarm requires a further trouble ticket to be assigned, its status changes to **In Progress**.
- **Obsolete Alarms**: The status of the alarm gets set automatically to timed out and a new alarm may get generated if none of the above conditions occur within the preset time-out period.
- **Acknowledged Alarm**: Before generating the trouble ticket, you acknowledge the alarm and then can assign a trouble ticket.
- The status of the alarm changes to **In Progress** once it is assigned to someone. If the trouble ticket is successfully completed, the status changes to **Resolved.** If the trouble ticket is ignored, its status changes to **Ignored.**

- **Time Out Alarms**: If the trouble ticket is neither resolved nor ignored within time out, the alarm's status is set to **Timed Out** and a new alarm may be generated if alarm condition still exist.
- Alarms can also be cleared by the system itself. If a fiber fault type alarm is either **Pending**, **Acknowledged** or **In Progress**, and the fault has been repaired (and the repair confirmed by a fault event with cleared status, as per alarm type definition), the alarm status is automatically set to **Resolved**.

Note: *You can edit any configuration for a new alarm. To edit any configuration for a new alarm, you need to edit details under the* ***Alarm Definition****,* ***Alarm Content****,* ***Alert Sending****, and* ***Automatic Events*** *tabs. For more information on alarm definition, see Adjusting Alarm Severity Based on Logical Operators* on page 103*. For more information on alarm content, see Configuring the Primary and Secondary Grouping* on page 112*. For more information on alert sending, see Configuring Alarm Notification* on page 116*. For more information on automatic events, see Configuring Automatic Events* on page 119*.*

Viewing System Status

The system status window shows the current status of the NQMSfiber system. This is very important as it provides a real-time view of the EMS system using its various attributes. You cannot modify this information.

To view the system status:

From the **Monitoring** menu, select **Status**.

The **EMS Status** window indicates how long the system is up and running, and displays a online/offline status.

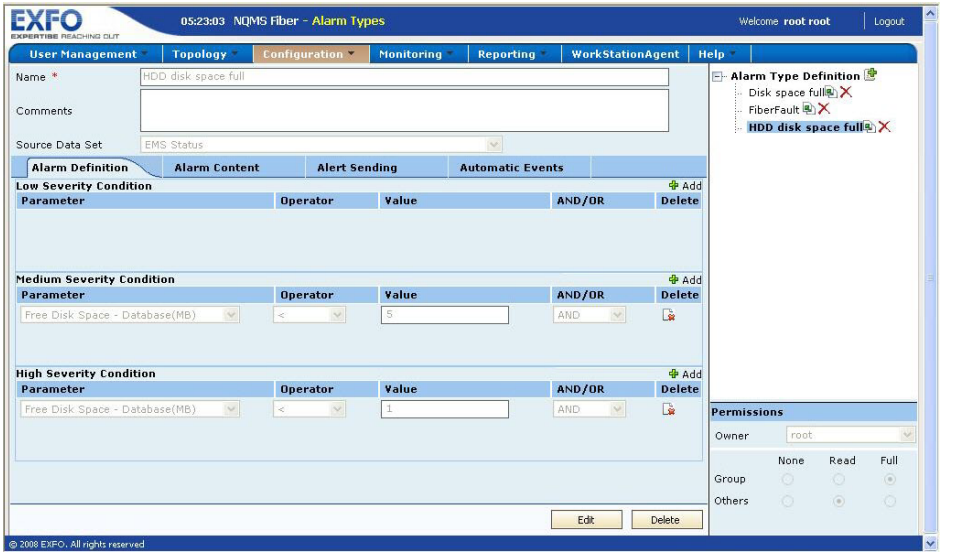
The **EMS Status** lists the following information about the system:

- **Status**
- **Up Time**
- **Available Memory**
- **System Free Disk Space**
- **Database Free Disk Space**

- **Backup Free Disk Space**
- **Processor Load**

These statuses can be used for creation of an alarm type. EMS status page will upload the EMS data for every 10 mins.

The following example shows alarm type based for disk space full statuses.

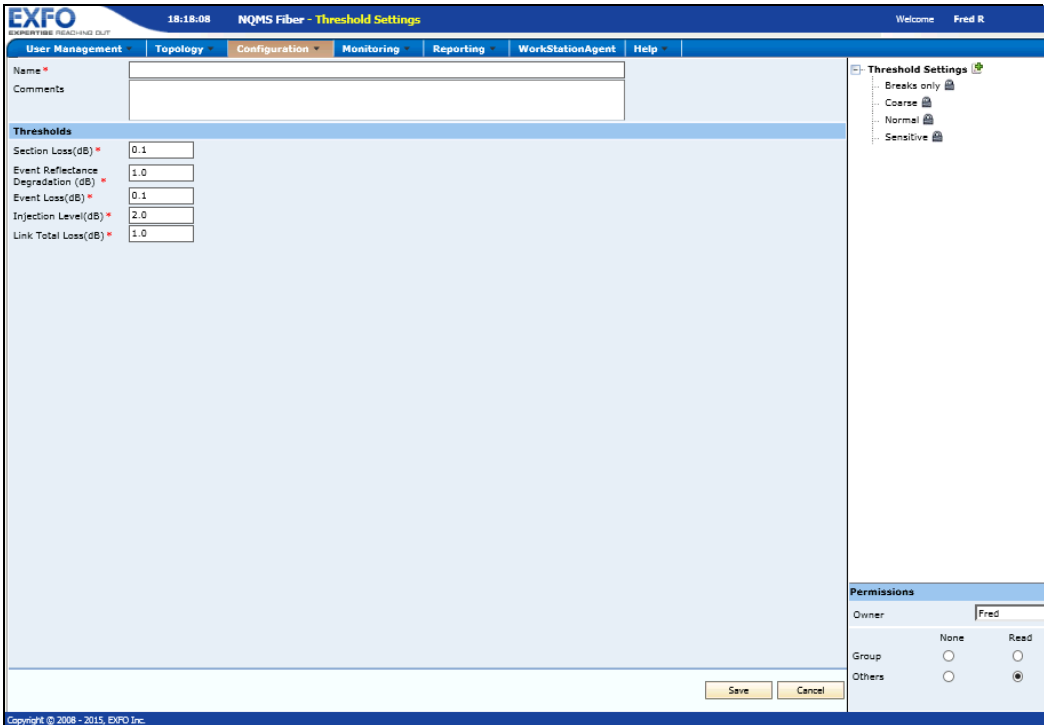


Modifying Fault Detection Threshold

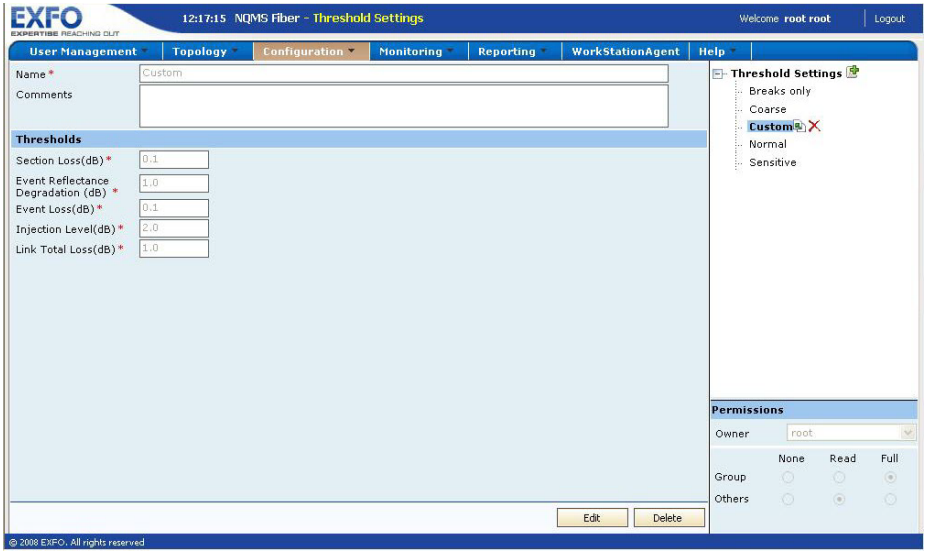
Threshold refers to a measurement value, which when exceeded results in generation of new fault by the NQMSfiber system. A custom set of threshold can be created and applied to all RTUs ideally before commissioning of new routes or new test-set-up. See Configure Test Setup Settings on *page 43*.

To modify the fault detection threshold:

1. From the **Configuration** menu, select **Threshold Settings**.



2. Click **Custom** under **Threshold Settings** on the right of the window.



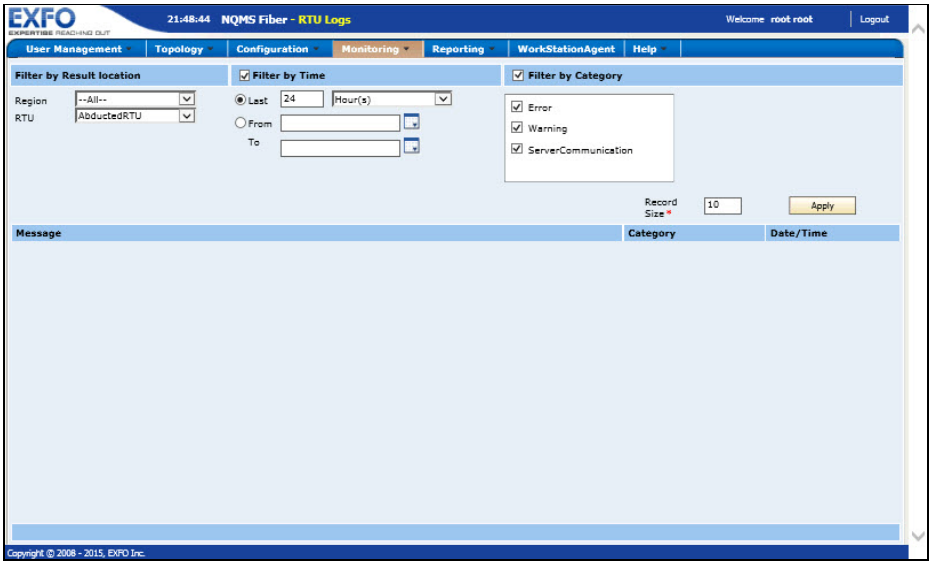
3. Click **Edit**.
4. Modify the threshold settings.
5. Click **Save** to apply your changes, or **Cancel** to discard them. Synchronize manually with the RTUs you want the new/changed settings to become available for or applied to immediately.

Consulting RTU logs

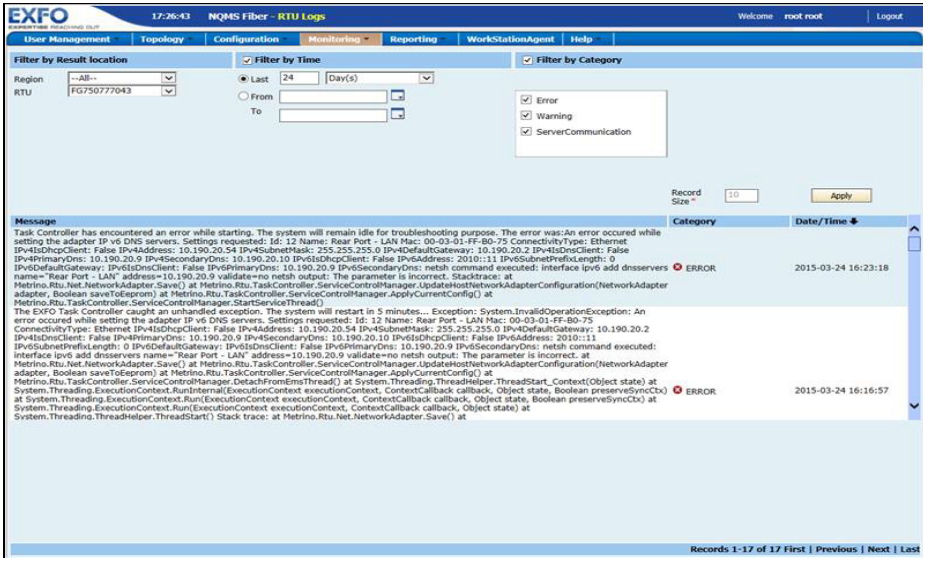
RTU logs are log events uploaded from each RTU and stored on EMS. They list the various activities performed by the RTU. You can retrieve and view the logs of the RTU.

To view RTU logs:

1. From the **Monitoring** menu, select **RTU Logs**.
2. Fill out the required information:
   - **Filter by Result Location:** select the Region and the RTU whose logs need to be generated.
   - **Filter by Time:** enter the time period for which the RTU logs need to be generated.
   - **Filter by Category:** select the category for which the RTU logs need to be generated. Categories are classified into Error, Warning and Server Communication. You can select all the categories for generating an RTU log.



3. Click **Apply** to view the results.



Results are displayed at the bottom of the window showing log information about the **Message**, **Category**, and **Date/Time**.

7 Testing Network Elements

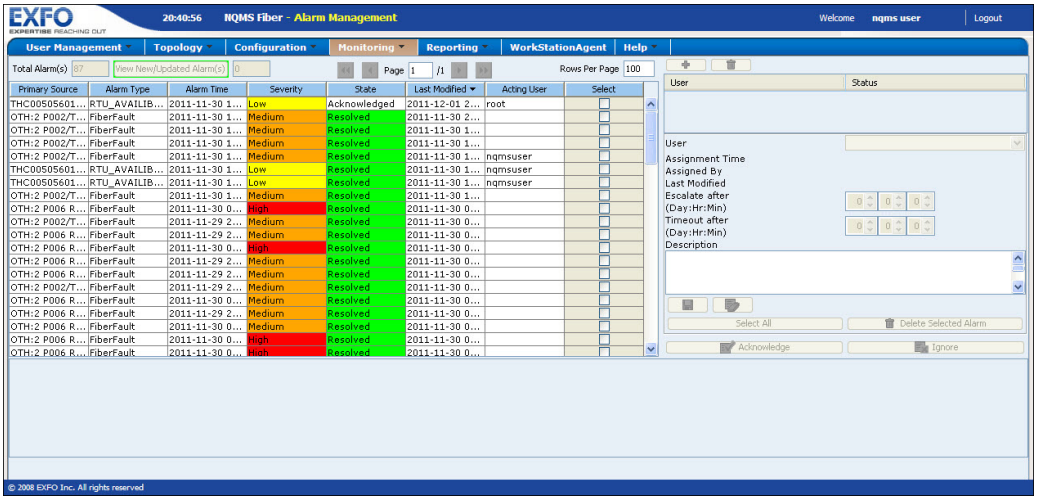
Performing Tests on Demand

Test on demand refers to the immediate execution of a test setup on the RTU. You can initiate a test on demand as and when required. Each test on demand is transferred to the RTU and executed with a higher priority than other scheduled jobs (but lower priority than references and ad hoc tests).

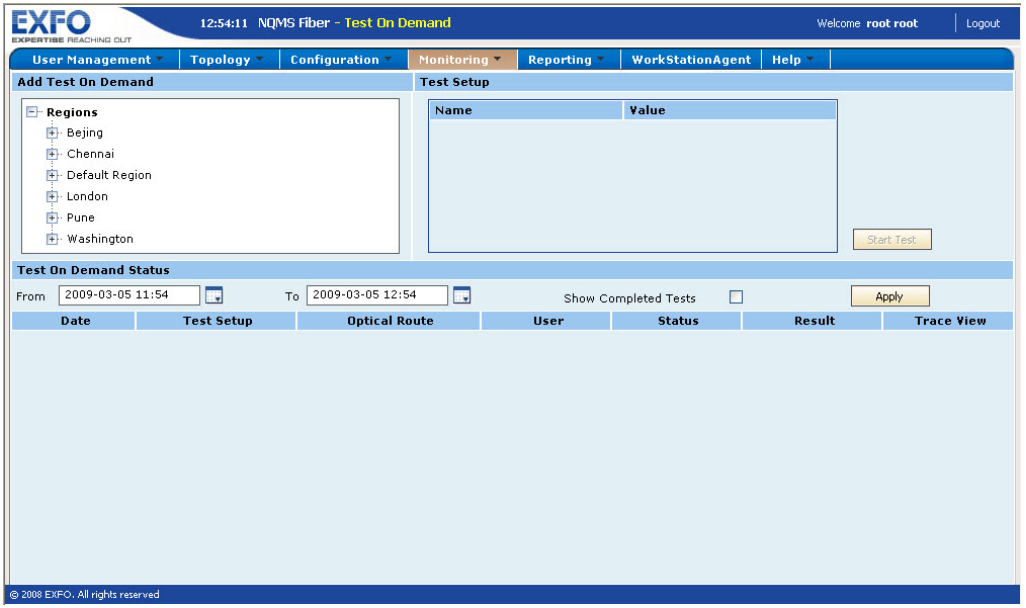
When the RTU encounters a problem on an optical route, the test on demand will trigger a fault (exactly the same way another scheduled job triggers it). Otherwise, the result will be uploaded to the EMS.

To perform a test on demand:

1. From the **Monitoring** menu, select **Test on Demand**.



2. From the tree structure, select the required parameter.



- **Regions**: region where the RTU's network infrastructure is located.
- **Default Region**: sub-region where the RTU's network infrastructure is located.
- **Remote Test Unit**
- **Optical Routes**
- **Test Setups**

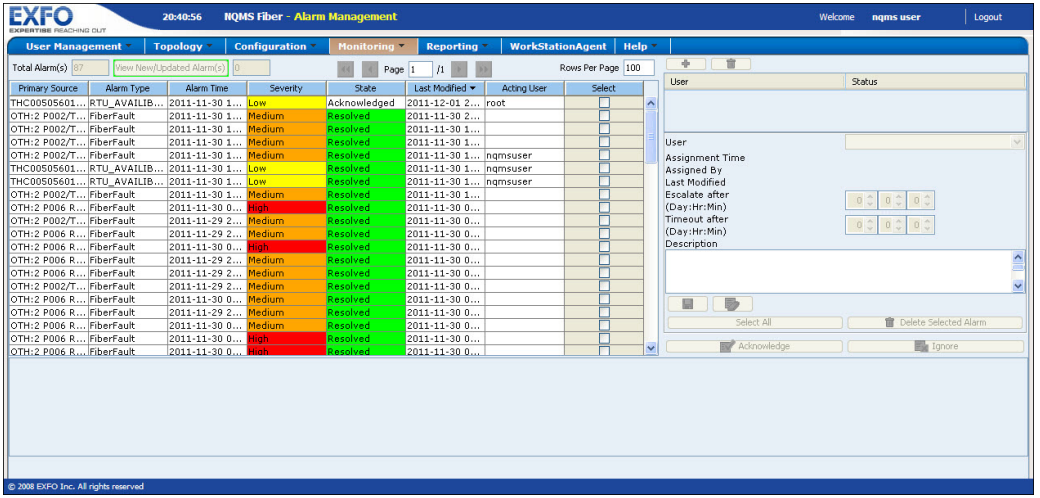
3. Click **Start Test**.

Viewing the Test on Demand Status

You can view all the tests on demand performed on a particular RTU by all the users.

To view the status of the test on demand:

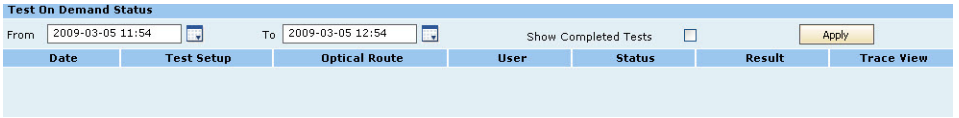
1. From the **Monitoring** menu, select **Test on Demand**.



2. Under **Test on Demand Status**, perform the following:

2a. To select the start date/time, click corresponding to **From** and select the required start date and time.

2b. To select the end date/time, click corresponding to **To** and select the required end date and time.



Note: ***To*** *date is not updating with current time. You have to refresh the page (to actualize the* ***To*** *time to current time) to display a test that was just completed in the meantime.*

3. To view the status of completed tests, select **Show Completed Tests**.
4. Click **Apply**. The results are displayed in the table below the **Test on Demand Status**.

8 Working with Topology

This chapter provides information about configuring different regions and sites for an RTU. It also provides information about topology view which provides a schematic view of the network.

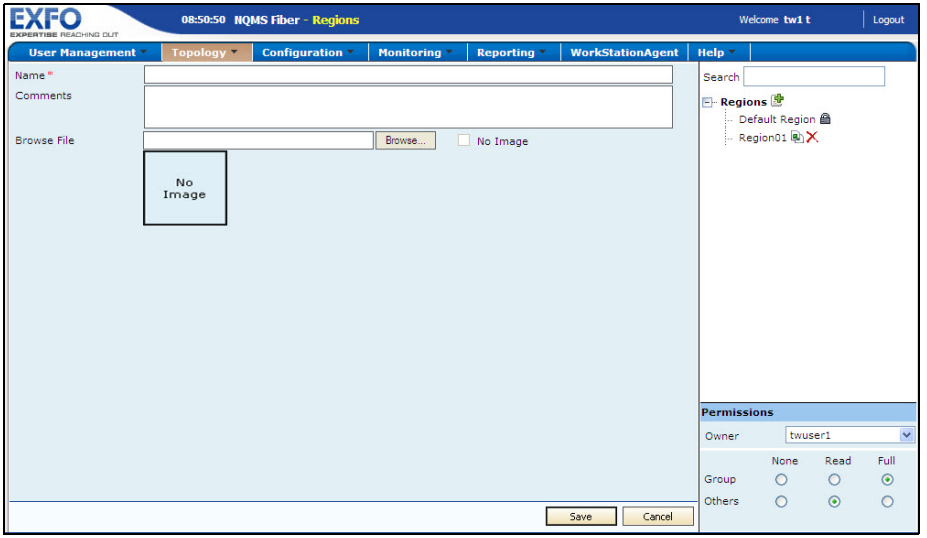
Regions

Regions under NQMSfiber refers to a geographical area consisting of a collection of sites including those where the RTUs are installed. The RTU has to be a part of a region and the system allows you to associate the RTU to a region or a site.

NQMSfiber system allows you to add, edit, delete or clone a region. You can be a member of many different regions. All regions along with the default region are presented as bubbles over one optional background in the network diagram.

To add a region:

1. From the **Topology** menu, select **Regions**.
2. From the list of regions, click .



3. Fill out the required information:
   - **Name**: is mandatory and has to be entered.
   - **Comments**
   - **Browse File**: to select an image file to be displayed as a topology background of that region.
4. Click **Save** to apply your changes, or **Cancel** to discard them.
5. In the **Search** field, you can search the region.

To edit a region:

1. From the **Topology** menu, select **Regions**.
2. From the tree structure, click the region to be edited.
3. Click **Edit**. The fields of the selected region get enabled.
4. Modify the required information.
   - **Name**
   - **Comments**
   - **Browse File**

     Click **No Image** check box to delete the image which is displayed for a particular region.
5. Click **Save** to apply your changes, or **Cancel** to discard them.

Note: *From the tree structure, select the required region and click* *to clone the region.*

Note: *The assignment of a user to a region needs to be made in user management using* ***Roles*** *(See User Management* on page 13*). The region name must match with the role name.*

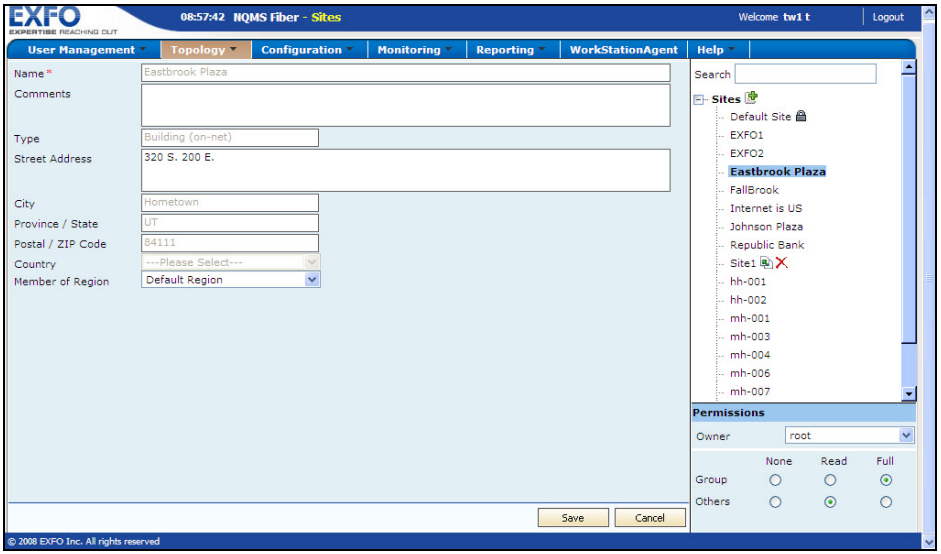
Sites

The system enables you to add, edit, delete and clone a site. You can view various sites for a particular region in the **Site View** of the topology network diagram.

Sites Synchronized from an external database mainly OSPInSight are read-only sites and cannot be edited except for member of region setting.

To add a site:

1. From the **Topology** menu, select **Sites**.
2. From the list of sites, click .



3. Fill out the required information:

- **Name**: is mandatory and has to be entered.
- **Comments**
- **Type**
- **Street Address**
- **City**
- **Province/State**
- **Postal/ZIP Code**
- **Country**
- **Member of Region**: select the region from the list to which the site belongs.

4. Click **Save** to apply your changes, or **Cancel** to discard them.

Note: *If site in OSPInSight is no longer part of a route (if it is deleted from list of GIS routes) then the site will change name with unique ID.*

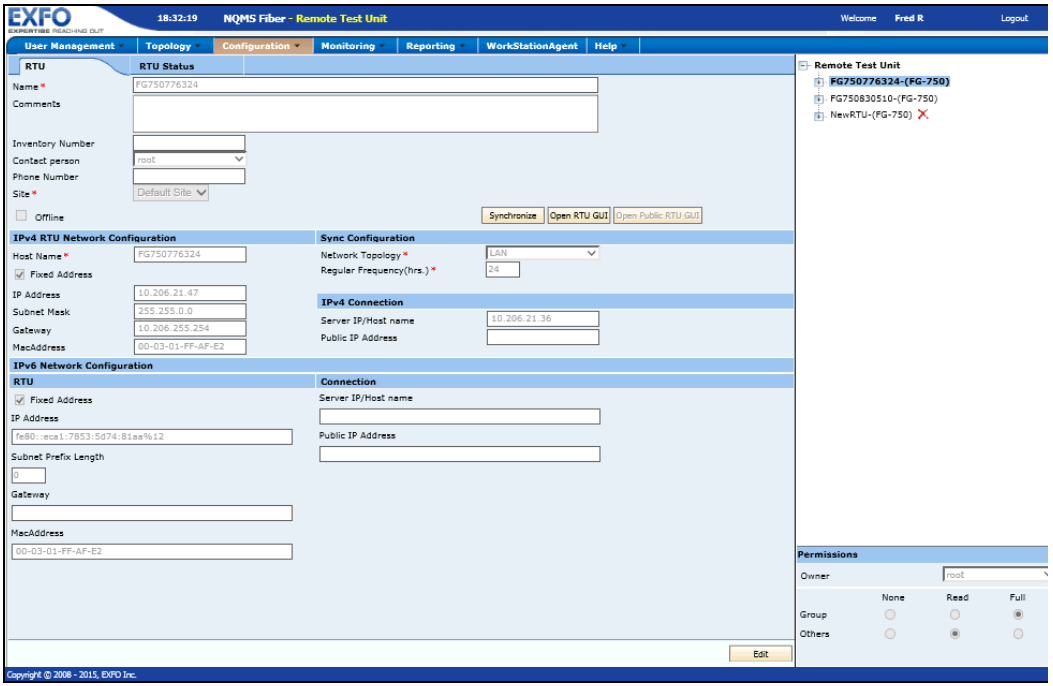
On deletion of site from OSPInSight, EMS converts those sites into following format:

GIS-site name- unique id.

Consider an example where the site names are site 7 and site 9, after deletion from OSPInSight, the site names changes to GIS- site 7-201 and GIS- site 9-202 respectively.

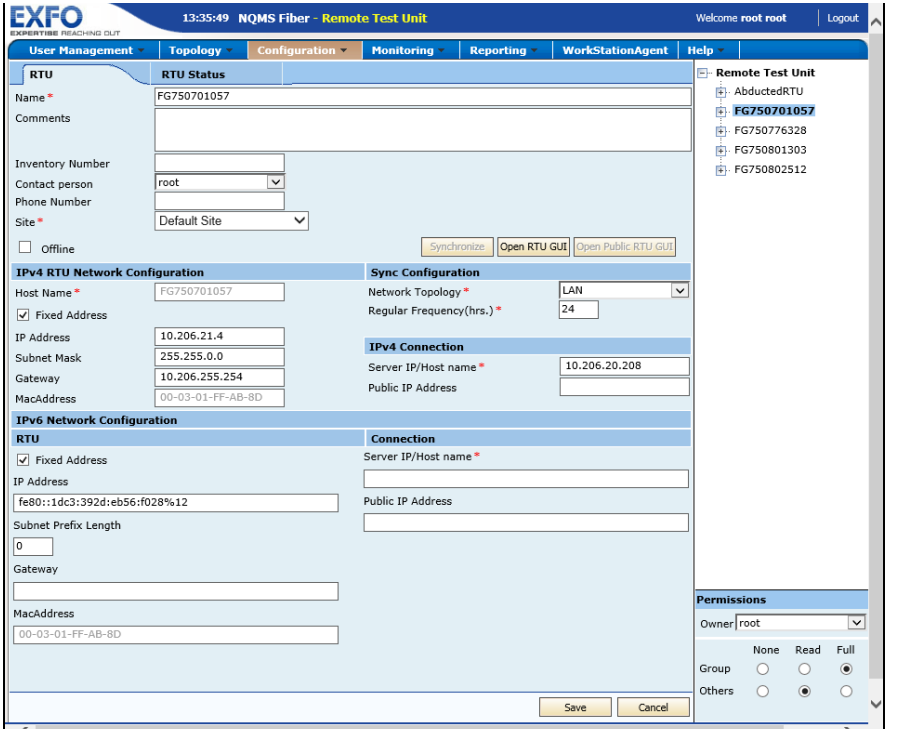
Assigning an RTU to a site:

1. From the **Configuration** menu, select **Remote Test Unit**.



2. Select the **Remote Test Unit** on the right of the window.

3. Click **Edit**.



4. **Site:** Select the site to which an RTU has to be assigned.

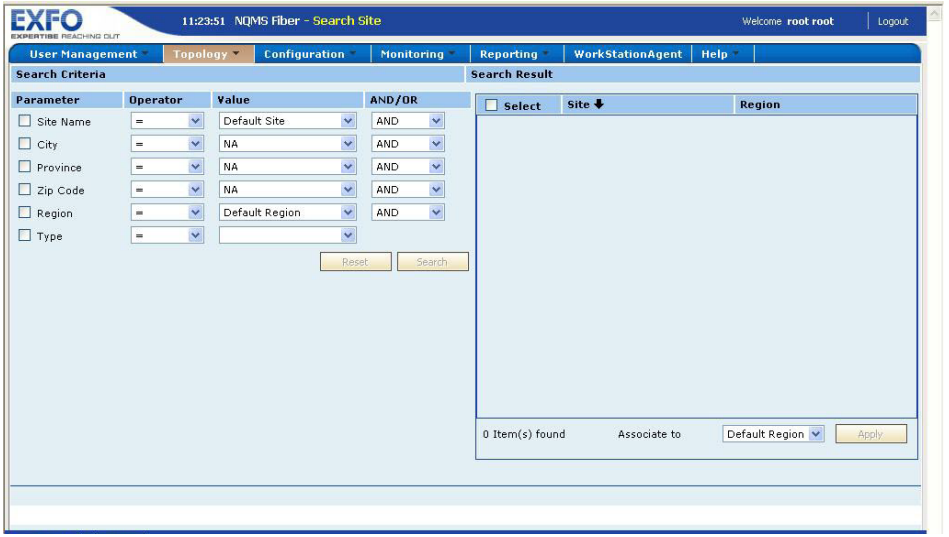
5. Click **Save** to apply your changes, or **Cancel** to discard them.

Associate Sites to a Region

This is used when multiple sites are created from the synchronization with OSPInSight, and topology per region is required. Here, batch attachment of sites to a region is possible.

To associate sites to a region:

1. From the **Topology** menu, select **Associate Sites to a Region**.



2. Select the required Parameters and their search criteria (**Operator**, **Value** and **AND/OR**).
   - **Site Name**
   - **City**
   - **Province**
   - **Zip Code**
   - **Region**
   - **Type**
3. Click **Reset** to cancel the changes, or **Search** to search the site.

   You will find the searched site in the **Search Result** pane.

2D Topology

Topology view provides a 2 dimensional view of the network configuration. It helps to study the arrangement or mapping of elements of the RTU using four different views; **Region View**, **Site View**, **Cable Span View**, and **Optical Route View**.

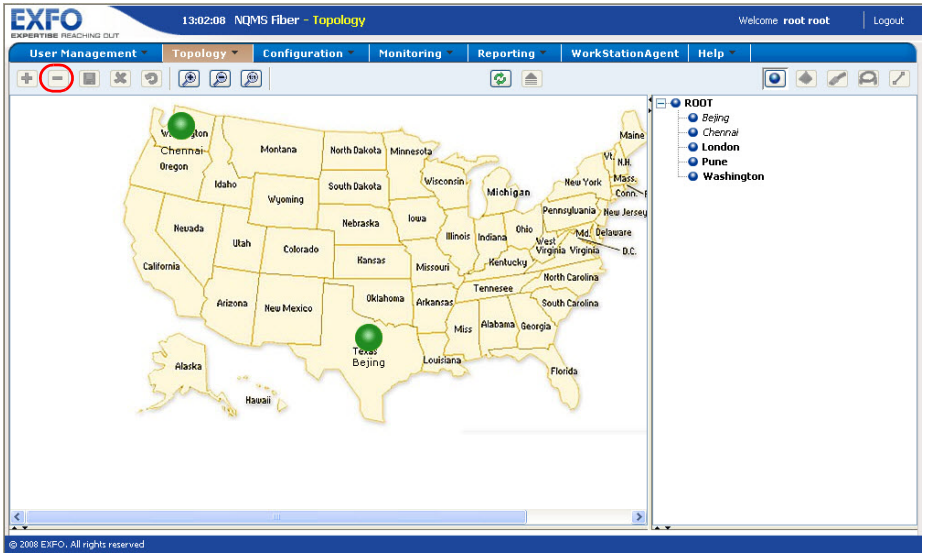
Network Status View

Status view under topology displays the various regions of your network and their respective statuses. You can view the map and nest in giving region to view a schematic region by clicking on the sphere, on the map representing the region. You can also view the information about all the sites under the specific region and their connectivity with the other sites.

To view the region view:

From the **Topology** menu, select **Topology View**.

The region view can also be displayed by clicking the icon present on the right side of the topology screen.



The **Region View** screen is displayed listing the various regions for the RTU. You can also remove a particular region by clicking the at the top.

Note: *You must have the appropriate user rights to add, modify, or delete various elements in the topology view.*

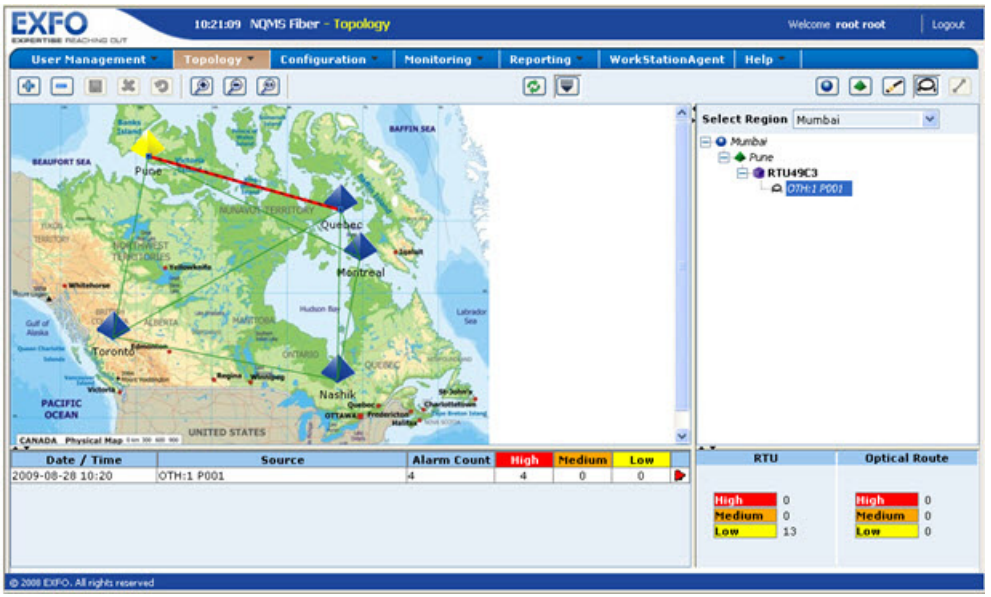
To view the site view:

1. From the **Topology** menu, select the **Topology View**.

   The region view screen is displayed.

Note: *Site View, Cable Span View, and Optical Routes View are greyed out and get enabled only when you select a region under **Region View**.*

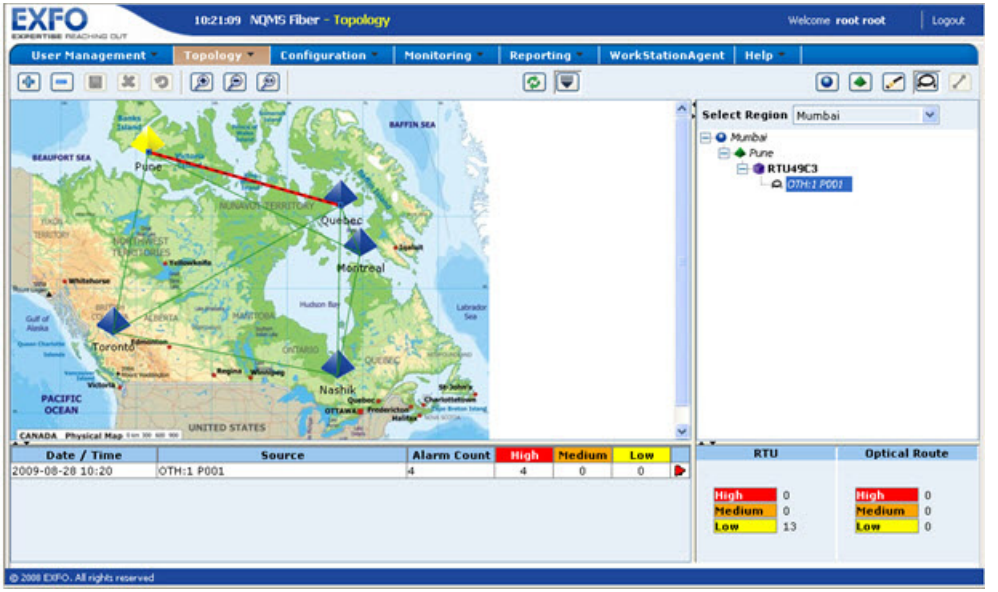
2. Double-click any region on the map in the network status view. The **Region View** screen is displayed listing all the sites, cables and optical route under that region.



Note: *The site view can also be displayed by clicking the* *icon on the right side of the topology screen.*

In addition, you can click the sites or on the route in alarm state (changes color to yellow, orange, or red as per severity) to display the following alarm information:

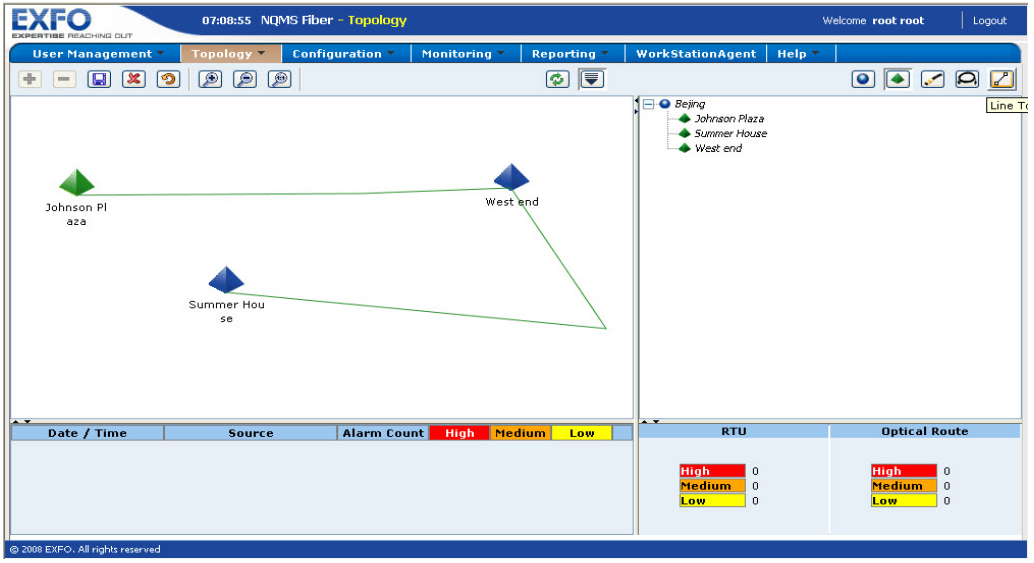
- **Date/Time**: date and time when alarm was generated.
- **Source**: source on which the alarm was generated.
- **Alarm Count**: total number of alarms generated.
- **High**: numbers of high severity alarms.
- **Medium**: number of medium severity alarms.
- **Low**: number of low severity alarms.



You can also view the total number of high, medium and low severity alarms for the RTU and the optical route which are displayed in the right hand corner.

Modifying Sites

The interconnection between the sites represents a cable or a duct of cables. A cable between two sites can be added using icon. A site can be moved by clicking the site icon and by moving it around.



Cable Span View

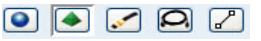
Cable span view displays all the cable spans for a particular region. It displays connectivity with cables between different sites. You can also use **Line Tool** to draw cable spans between two sites. It is disabled for all the other views and gets enabled only when you select the site view or the cable span view.

To view the cable span view:

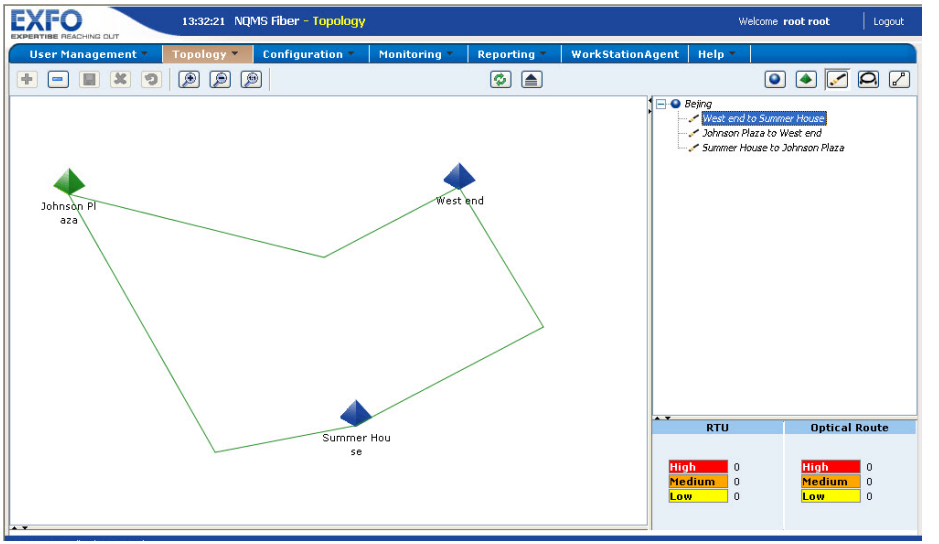
1. From the **Topology** menu, select **Topology View**.

   The region view screen is displayed.

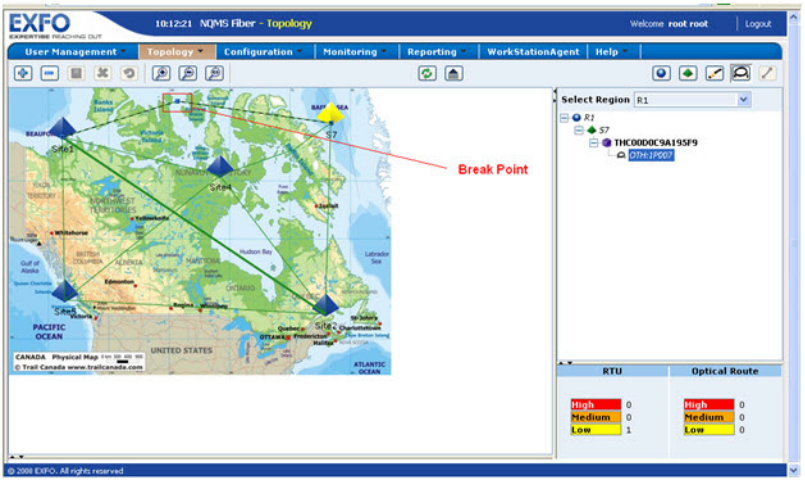
2. Click any region on the map in the region view. All the icons for the different views get enabled.



3. Click . The cable span view is displayed listing cable connectivity between different sites.



To add the breakpoint on a line: Select the cable span and right click, it will show a small square as a break point. Drag that break point to change the shape of line.

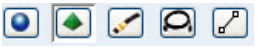


Optical Route View

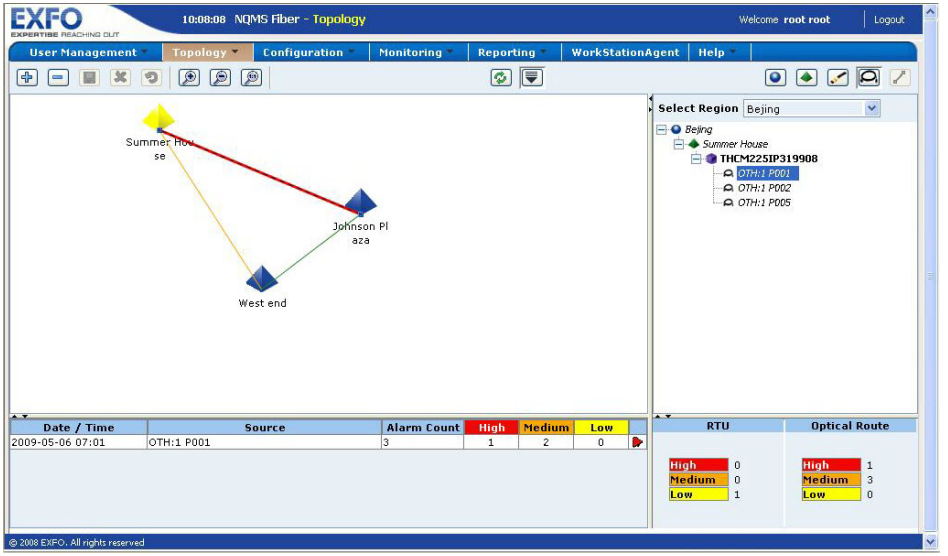
Optical route view displays all the optical routes that are generated by an RTU. Alarms are not mainly occurring on RTU sites but on optical routes defined by successive cable spans selected and assigned to a given route. If the route has an alarm, then color of all the cable spans affected turn to the color of the alarm severity of that route.

To view the optical route view:

1. From the **Topology** menu, select **Topology View**.
2. The region view screen is displayed.
3. Click any region on the map in the region view. All the icons for the different views get enabled.



4. Click . The **Optical Route View** screen is displayed.



5. Select a region from the **Select Region** list.
6. From the tree view, select the optical route you want to assign it to a cable span (The RTU along with the optical routes are listed on the right for the selected region).
7. click the line that connects the sites.
8. Click .
9. The line becomes bold, click .
10. Click to display the alarm summary table.
11. Access to alarm is also possible by clicking .

9 Managing Results

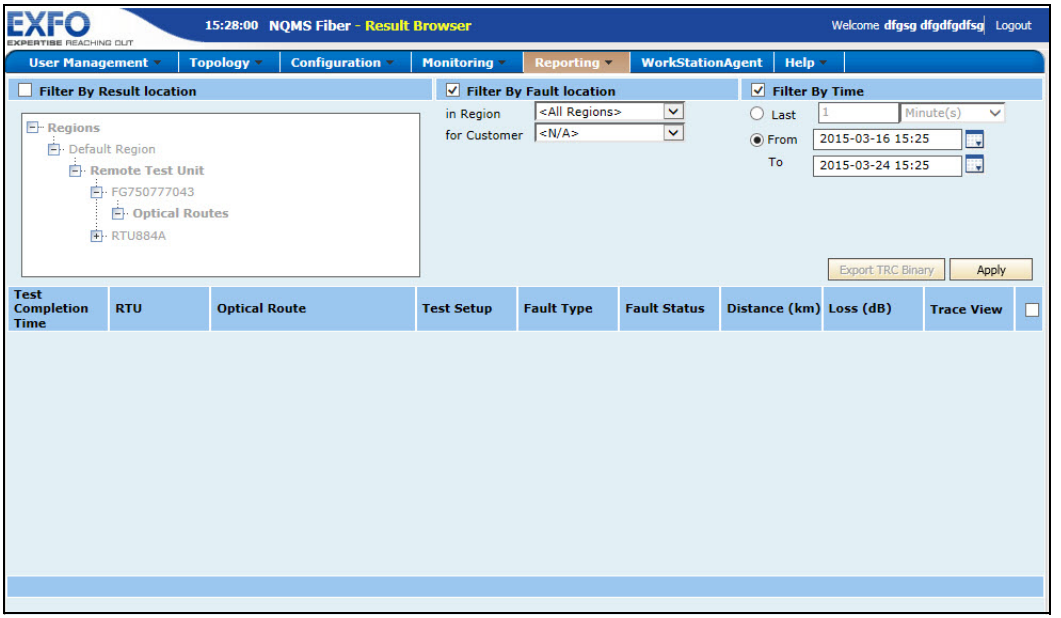
This chapter provides information on how to view various results generated in the system.

Viewing Results with the Result Browser

The **Result Browser** window allows you to browse records one by one in working sets. It also provides a trace view of one OTDR result at a time. You can also export several traces at the same time. It also enables you to browse them by result location or fault location and filter (but not both at same time) and can add a filter for time.

To view the results using Result Browser:

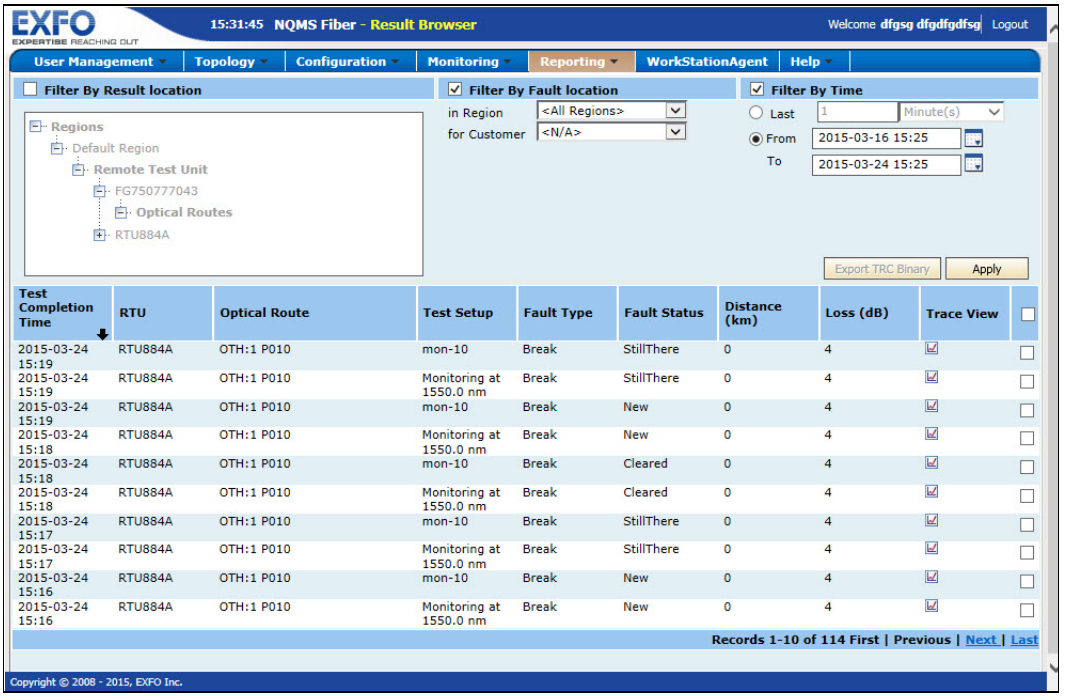
1. From the **Reporting** menu, select **Result Browser**.



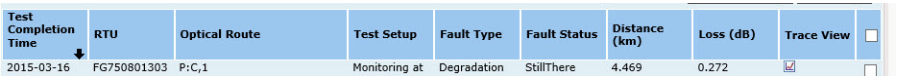
2. To filter the results by result location, select the **Filter By Result location** check box and select the required parameter from the tree structure by highlighting one level of the three, either the entire region, one specific RTU site, or the route you wish to find results.

3. Click **Apply**, and all results under the selected category will be found and displayed at the bottom sorted by date.

   - **Region**: to filter results to contain only those results where the RTU's network infrastructure is in any of your regions.
   - **Default Region**: to filter results to contain only those results where the RTU's network infrastructure is in your selected region.
   - **Remote Test Unit**: to filter the results to contain only those results for the selected RTU.
   - **Optical Routes**: to filter the results to contain only those results for the selected optical route.
   - **Test Setups**: to filter the results to contain only those results for the selected test setup.



4. To filter the results by fault location, select the **Filter By Fault location** check box and select from the two lists:
   - **in Region**: to view only the results where the fault location's network infrastructure is in the selected region.
   - **for Customer**: to filter the results to contain only those faults where the selected customer is affected.
5. To add filter results by time to filter by result or fault location, select the **Filter By Time** check box and select from the two options:
   - Last N number of Results/Minutes/Hours/Days.
   - Results between two date and time values.
6. Click **Apply**. The NQMSfiber displays the results list according to the selected filters.



Test Completion Time	RTU	Optical Route	Test Setup	Fault Type	Fault Status	Distance (km)	Loss (dB)	Trace View	
2015-03-16	FG750801303	P:C,1	Monitoring at	Degradation	StillThere	4.469	0.272	☑	☐

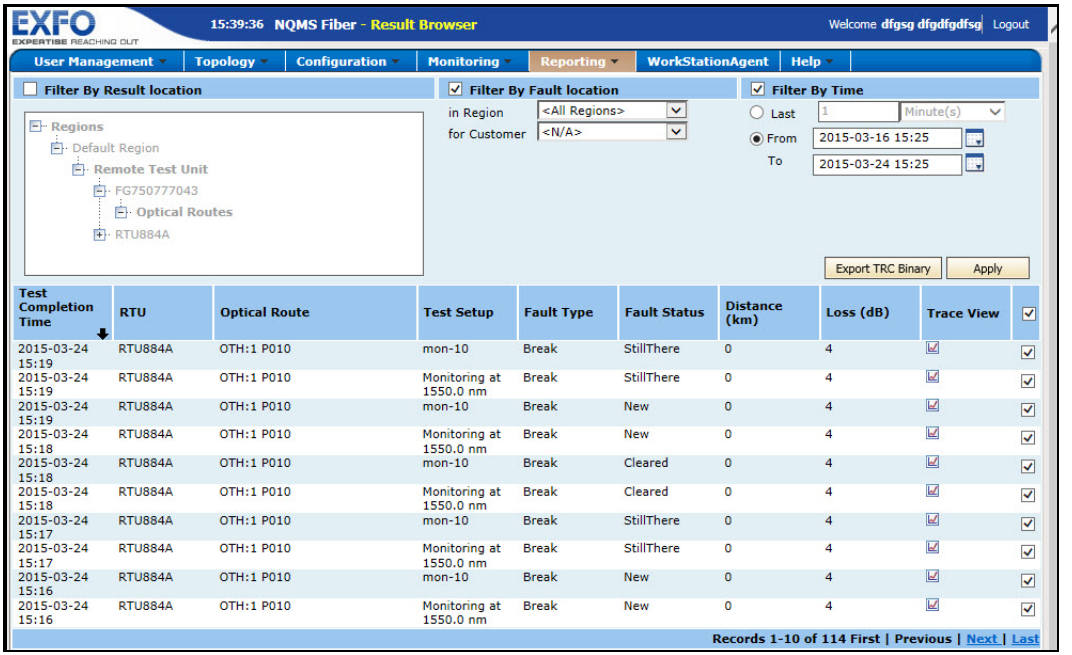
The results can be ordered by clicking the column header.

Exporting and viewing all ZIP results:

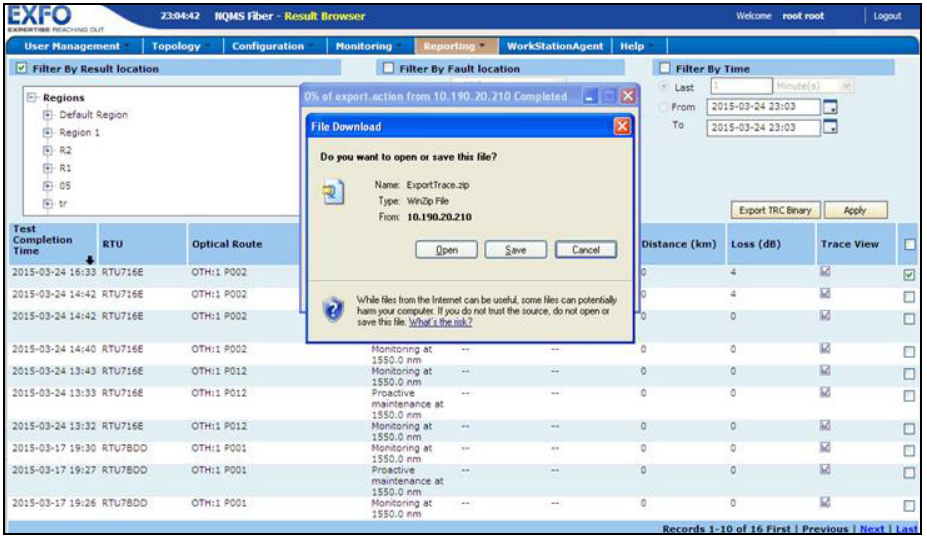
1. From the **Result Browser**, select the required parameters from the screen and click **Apply**.

   The NQMSfiber displays the results list according to the selected filters.

2. Select the check box next to the **Trace View**, all the results will be selected.



3. Click **Export TRC Binary**, the binary OTDR file for each result selected will be exported to a ZIP file and will be stored in the workstation at the specified location. You can now open all the OTDR results into any EXFO office tool such as OTDR viewer, Fast Reporter or Toolbox offline applications.

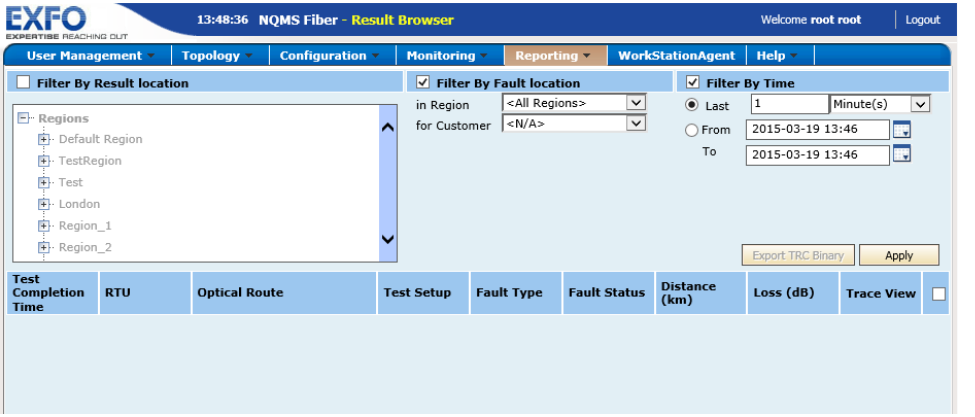


Trace Viewer

After the results are generated, you can click to open the Trace Viewer. The **Detail** trace displays the actual current OTDR measurement in the trace viewer. Four other traces are **REF**, **MIN**, **MAX**, and **AVG** facilitate comparisons of the current measurements.

To open the Trace Viewer:

1. From the **Reporting** menu, select **Result Browser**.



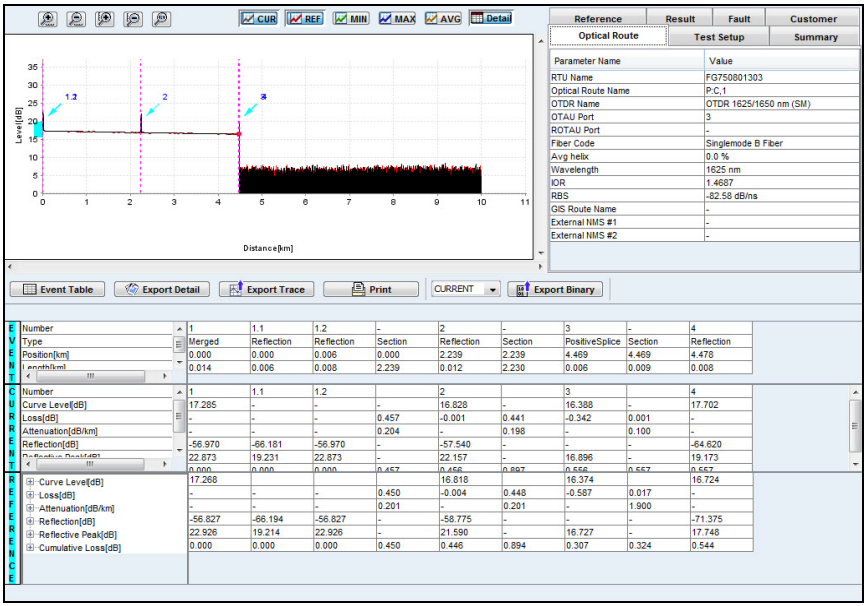
2. Select the required parameters from the screen and click **Apply**.

Note: *For more information about the Result Browser parameters, see* Managing Results *on page 163.*

The NQMSfiber displays the results list according to the selected filters.

Test Completion Time	RTU	Optical Route	Test Setup	Fault Type	Fault Status	Distance (km)	Loss (dB)	Trace View	
2015-03-16 15:28	FG750801303	P:C,1	Monitoring at 1625.0 nm	Degradation	StillThere	4.469	0.272	☑	☐
2015-03-16 15:28	FG750801303	P:C,1	Monitoring at 1625.0 nm	Degradation	Changed	4.469	0.272	☑	☐
2015-03-16 15:28	FG750801303	P:C,1	Monitoring at 1625.0 nm	Degradation	StillThere	4.469	0.286	☑	☐

3. Click to open the Trace Viewer.



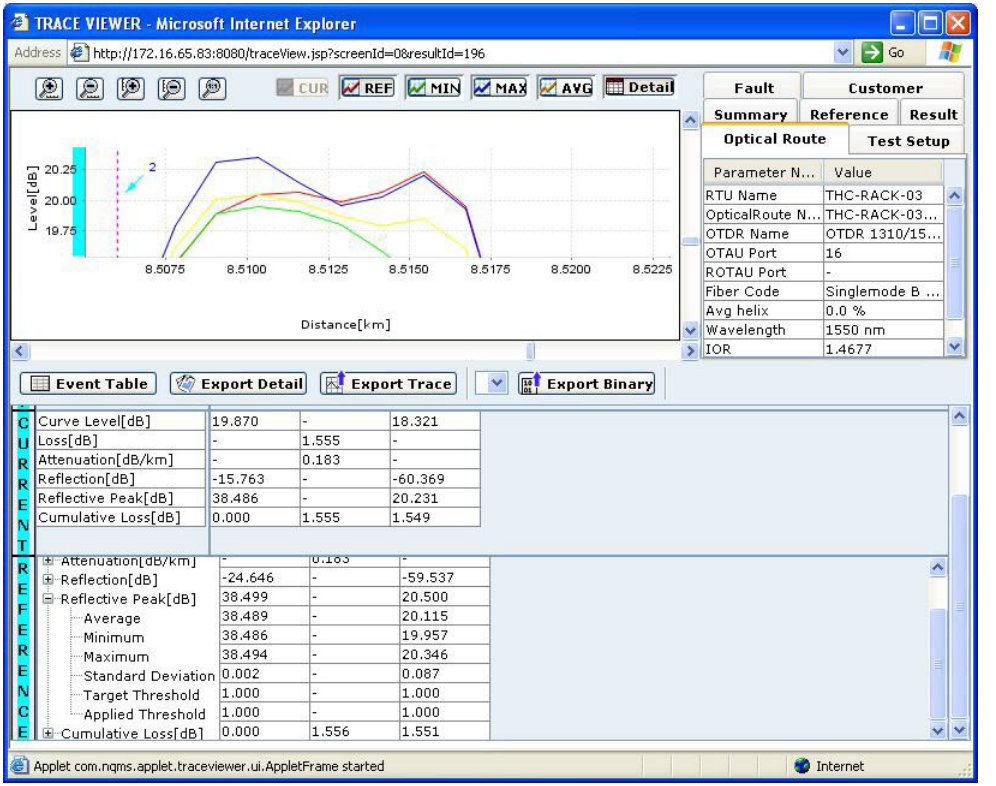
Trace Viewer enables experienced users to make complimentary analysis and a complete assessment of the optical fiber link by comparing the four results with the current OTDR measurements. Brief description about the traces is as follows:

Reference: displays the OTDR measurement values that were recorded the very first time the test setup was run on the OTH/RTU. This OTDR measurement when initially analyzed, determines the structure of the event characterization table associated with the test setup.

Minimum: during the learning process, many measurements are made on the test setup. The minimum value recorded at each position of the OTDR measurement during the learning process is recorded. The MIN trace graph displays the reconstruction of the OTDR measurement using the minimum realized value at each position.

Maximum: during the learning process, the MAX trace graph displays a reconstruction of an OTDR measurement using the maximum realized value at each position.

Average: during the learning process, at each position of the OTDR measurement, the average realized value is calculated. The AVG trace graph displays the reconstruction of an OTDR measurement using the average value calculated at each position during learning cycle.



The Trace Viewer displays the OTDR trace graph according to the selected zoom factor and the selected events.

- NQMSfiber calculates the distance (X axis) zoom factor to fit the selected events.
- The horizontal center of the graph is calculated according to the first and last selected events.

When the Trace Viewer is first opened, the graph displays all events.

The elements available in the Trace Viewer are described below:

Element	Description
X axis (Distance)	➤ Unit of measurement: km or kfeet. ➤ Maximum value: depends on the data to display.
Y axis (Power)	➤ Unit of measurement: dB. ➤ Maximum value: depends on the data to display. ➤ Injection level: a blue rectangle from the minimum injection level to the maximum injection level. The blue rectangle on the Y axis (relative power) indicates the proper injection level range for the defined test pulse.

Trace graphs can include the following symbols:

- **Red star**: if the result contains a fault, NQMSfiber displays it on the current trace line, at the position of the fault.
- **GIS Route Details**: you will only see the different icons representing locations and line representing cables along the route that was created in GIS. If there are network infrastructures defined along the optical route, NQMSfiber displays them in a linear view below the graph at the correct distance according to the segmentation data. Network infrastructures are represented with a small picture of their element type.

  When you move mouse on a cable or site in the linear view, a tool tip will pop-up providing name, and details of sites, which port used or which fiber color used in that particular cable. GIS route is associated to optical route in the optical route configuration dialog (see Defining Optical Routes *on page 69*).

OTDR events and characterization tables are displayed in the lower portion of the trace viewer.

NQMSfiber displays the event list which has as many columns as the number of events in the characterization table for the selected result.

Depending on the selected result, NQMSfiber displays one or more characterization tables. A characterization table contains folders for the following parameters for each event:

- **Curve Level (dB)**
- **Loss (dB)**
- **Attenuation (dB/km)**
- **Reflection (dB)**
- **Reflective Peak (dB)**
- **Cumulative Loss (dB)**

Click the reference folders to display minimum, maximum, and average values for any characterization parameter calculated based on learning cycle test results and to display standard deviation, targeted threshold and applied threshold.

If the result contains a fault, NQMSfiber highlights the fault event column.

To select an event, click a column in the event characterization table. Press and hold the Ctrl or Shift key to select multiple columns. When more than one column is selected, the last column selected will have the focus. NQMSfiber sets the horizontal center of the graph to be the position of the event that has the focus.

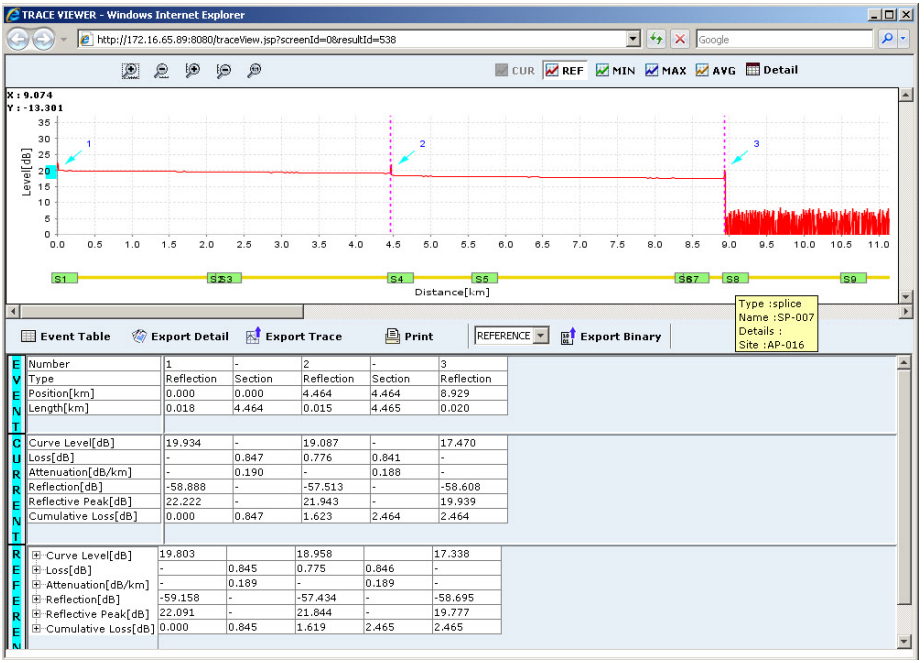
The following table provide a list of the commands and buttons that appear on the Trace Viewer menus and toolbars.

Button	Action
	Displays the current trace
	Displays the trace graph of an OTDR measurement that was made the very first time the test setup was run.
	Displays the trace graph of an OTDR measurement using the minimum realized value at each position during learning cycle.
	Displays the trace graph of an OTDR measurement using the maximum realized value at each position during learning cycle.
	Displays the trace graph of an OTDR measurement using the average realized value at each position during learning cycle.
	Zoom Distance ▸ Zoom In
	Zoom Distance ▸ Zoom Out
	Zoom Distance ▸ Zoom Full
	Zoom Level ▸ Zoom In
	Original
	Displays the trace graph of the actual current OTDR measurement.

In addition, the **Trace Viewer** window displays information about the following components on the right side:

- **Reference**
- **Result**
- **Fault**
- **Customer**
- **Optical Route**
- **Test Setup**
- **Summary**

The Trace Viewer with GIS route items is shown below.



EVENT	Number	1	-	2	-	3
	Type	Reflection	Section	Reflection	Section	Reflection
	Position[km]	0.000	0.000	4.464	4.464	8.929
	Length[km]	0.018	4.464	0.015	4.465	0.020
CURRENT	Curve Level[dB]	19.934	-	19.087	-	17.470
	Loss[dB]	-	0.847	0.776	0.841	-
	Attenuation[dB/km]	-	0.190	-	0.188	-
	Reflection[dB]	-58.888	-	-57.513	-	-58.608
	Reflective Peak[dB]	22.222	-	21.943	-	19.939
	Cumulative Loss[dB]	0.000	0.847	1.623	2.464	2.464
REFERENCE	⊞ Curve Level[dB]	19.803		18.958		17.338
	⊞ Loss[dB]	-	0.845	0.775	0.846	-
	⊞ Attenuation[dB/km]	-	0.189	-	0.189	-
	⊞ Reflection[dB]	-59.158	-	-57.434	-	-58.695
	⊞ Reflective Peak[dB]	22.091	-	21.844	-	19.777
	⊞ Cumulative Loss[dB]	0.000	0.845	1.619	2.465	2.465

Exporting Data from Trace Viewer

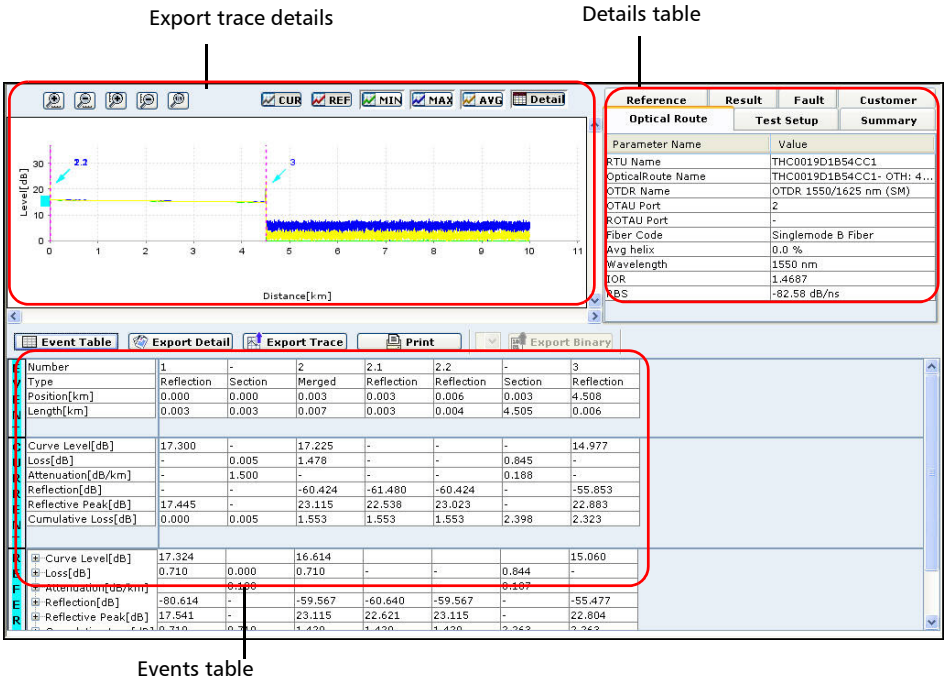
Trace Viewer displays data in a graphical format which can be exported to any folder on your workstation in ***binary (trc)*** or a ***comma separated value (csv)*** format. From the Trace Viewer, you can export the following elements:

- **Event table**: the event table appears at the bottom of the Trace Viewer screen and displays detailed information about the events, the current trace, and the reference trace. You can save (export) this data in a.csv format.
- **Detail table**: the detail table appears in the right corner of the Trace Viewer screen and displays information about the following components:
  - **Optical Route**
  - **Test Setup**
  - **Summary**
  - **Reference**
  - **Result**
  - **Fault**
  - **Customer**

You can export the results table in a .csv format. This is useful if you prefer to work with raw data and build your own reports.

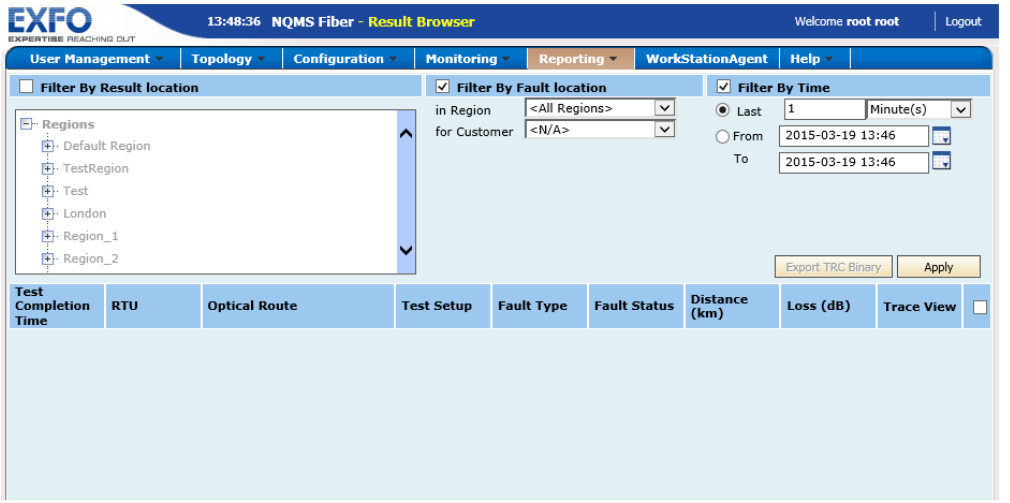
- **Trace in csv format**: you can export the data points of the OTDR trace (x and y coordinates) in a .csv format. This is useful if you prefer to work with raw data and build your own reports.

➤ **Trace in binary format**: You can export the OTDR trace in native .trc format. You will be able to open the trace with applications that support this format of file, such as EXFO free tool OTDR viewer or Fast Reporter back-office reporting tool. Note that these tools allow conversion of .trc in .sor Bellcore formats.



To export data from the trace viewer:

1. From the **Reporting** menu, select **Result Browser**.



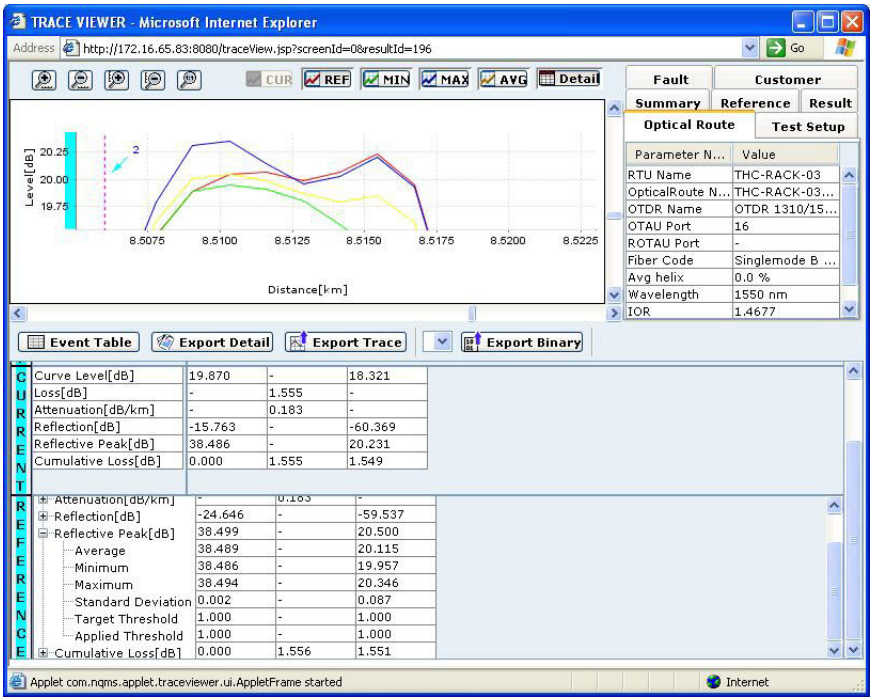
2. Select the required parameters from the screen and click **Apply**.

Note: *For more information about the Result Browser parameters, see* Viewing Results with the Result Browser *on page 163.*

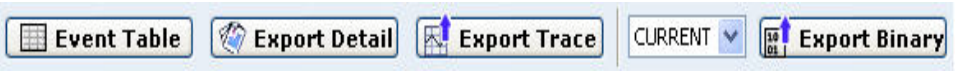
The NQMSfiber displays the results list according to the selected filters.

Test Completion Time	RTU	Optical Route	Test Setup	Fault Type	Fault Status	Distance (km)	Loss (dB)	Trace View	
2015-03-16 15:28	FG750801303	P:C,1	Monitoring at 1625.0 nm	Degradation	StillThere	4.469	0.272	☑	☐
2015-03-16 15:28	FG750801303	P:C,1	Monitoring at 1625.0 nm	Degradation	Changed	4.469	0.272	☑	☐
2015-03-16 15:28	FG750801303	P:C,1	Monitoring at 1625.0 nm	Degradation	StillThere	4.469	0.286	☑	☐

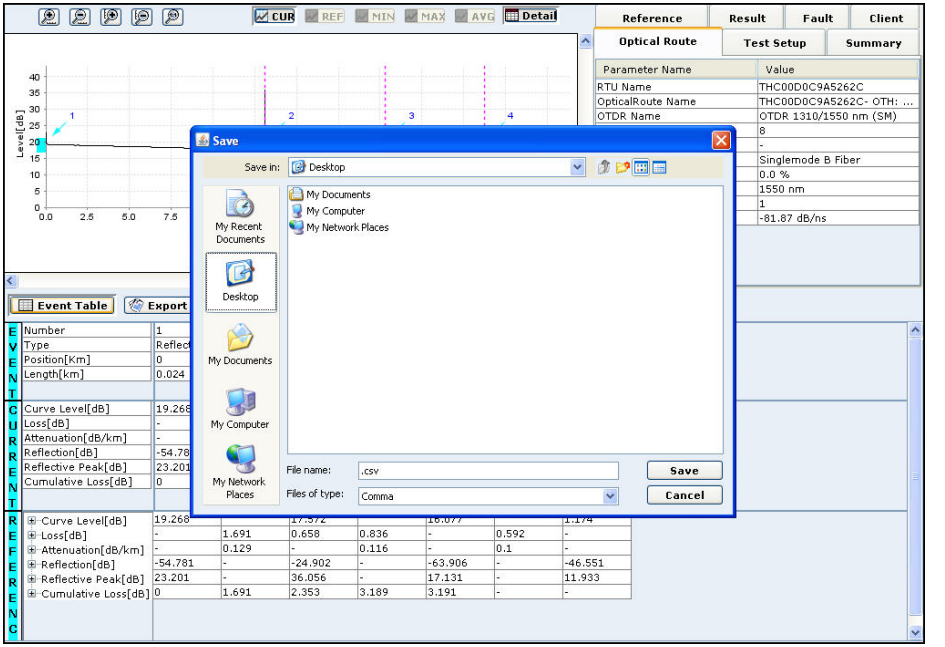
3. Click to open the Trace Viewer.



4. Click the button corresponding to the type of data that you want to export.



The **Save** dialog box is displayed, prompting you to save the data.



5. Select a location and click **Save**.

Physical Routing on Trace Viewer

The trace viewer displays the OTDR trace graph according to the selected zoom factor and the selected events. When the trace viewer is first opened, the graph displays all events.

When the system is configured to interface with GIS, the trace viewer displays a linear graphical view of the physical route. The data comes from GIS and is displayed as a yellow line, just under the graph.

The line represents the physical route and the green boxes display the various sites on that route. A Tool Tip appears when you move over the sites, showing details on the physical route. This complementary information is retrieved from OSPInsight from a stored query (view) or from a set of GIS route tables part of NQMSfiber scripted in the database at time of installation. The information can also be retrieved from another GIS web service when configured.

In addition, information about the faults appears under **Fault** in the details table (on the right).

Printing the OTDR traces from the Trace Viewer

From the Trace Viewer, you can print the graph for **CUR**, **REF**, **MIN**, **MAX**, and **AVG** traces.

To print a graph:

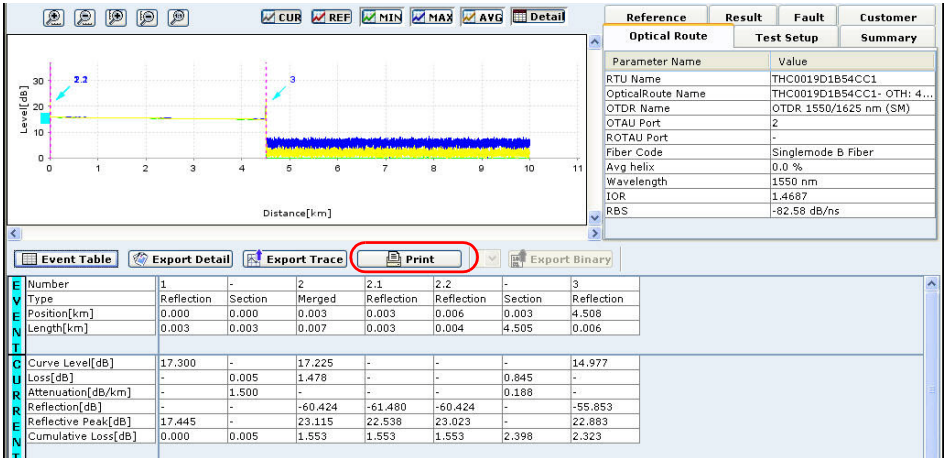
1. From the **Reporting** menu, select **Result Browser**.
2. Select the required parameters and click **Apply**.

Note: *For more information about the Result Browser parameters, see* Viewing Results with the Result Browser *on page 163.*

3. The NQMSfiber displays the results list according to the selected filters.

Test Completion Time	RTU	Optical Route	Test Setup	Fault Type	Fault Status	Distance (km)	Loss (dB)	Trace View	
2015-03-16 15:28	FG750801303	P:C,1	Monitoring at 1625.0 nm	Degradation	StillThere	4.469	0.272	☑	☐
2015-03-16 15:28	FG750801303	P:C,1	Monitoring at 1625.0 nm	Degradation	Changed	4.469	0.272	☑	☐
2015-03-16 15:28	FG750801303	P:C,1	Monitoring at 1625.0 nm	Degradation	StillThere	4.469	0.286	☑	☐

4. Click to open the Trace Viewer.
5. Click **Print**.

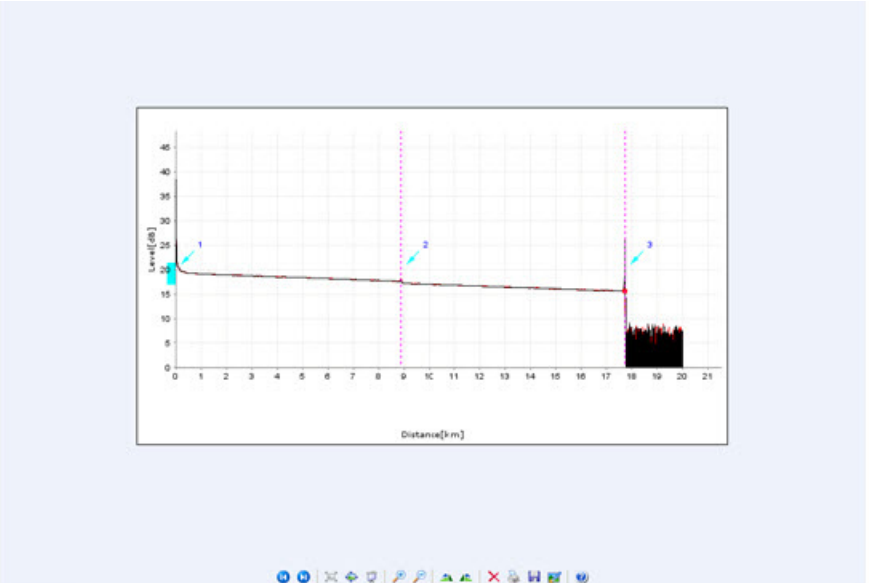


Printing a trace viewer files creates a PDF file in your browser and a temporary image file named Temp.png is also automatically saved on the desktop.

The full printout contains all the information you can actually access in the trace viewer window shown below. Note that is you have sites attached to the route, they will be listed at the last page in order to the appearance on the trace.

The temporary image file Temp.png will be replaced each time you print a new result. This file can be found on your desktop.

If you open this Temp.png, it will only show the graph as shown below.



By printing Temp.png, it will print only the trace view graph.

This Temp.png file will be present on desktop even after closing the Internet explorer window. It will be useful for you to view and print the graph.

Note: *For the printing, Adobe PDF has to be installed so that printing function can be used properly.*

10 Registering the Application

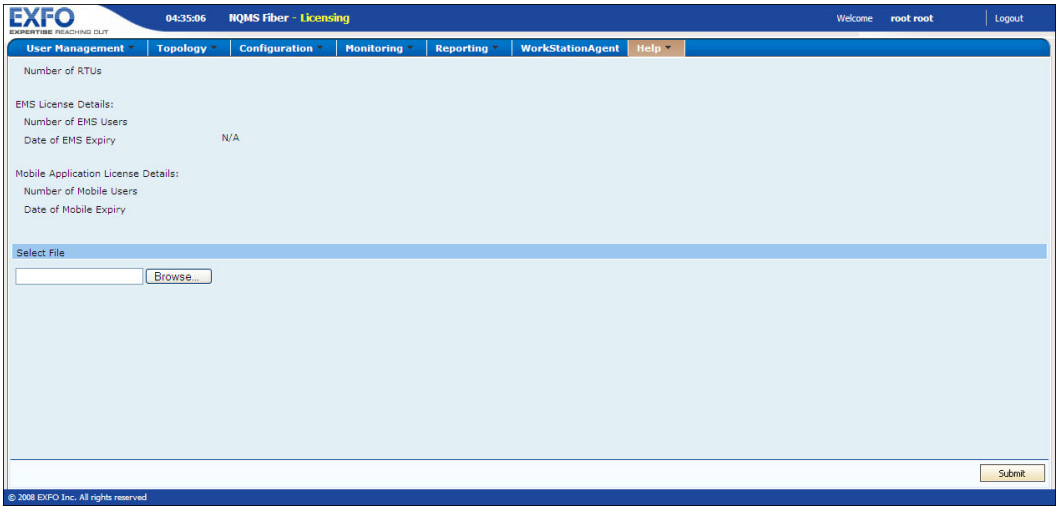
The NQMSfiber system functions using licenses. Normally the license file is configured at the time of installation. This license file controls the number of users, RTUs, last valid date of the license, and mobile users on the system. You should be able to log on to the system as soon as the installation is complete.

Upgrading the License

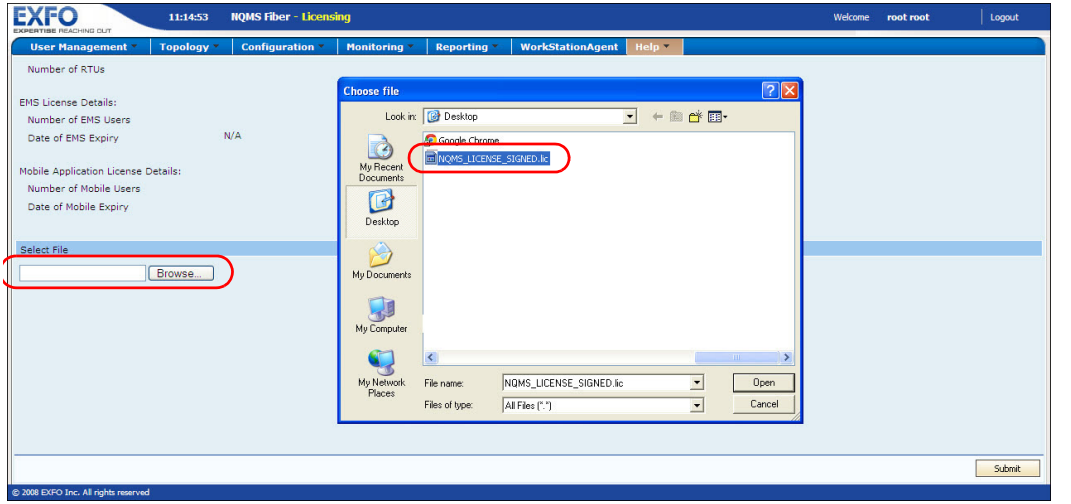
Note: *If the application prompts you for a license file, you will have to upgrade the license or apply for the license.*

To upgrade the license:

1. Contact EXFO for a new license file.
2. Start the AW application.
3. From the **Help** menu, select **Licensing**. The licensing page is displayed.



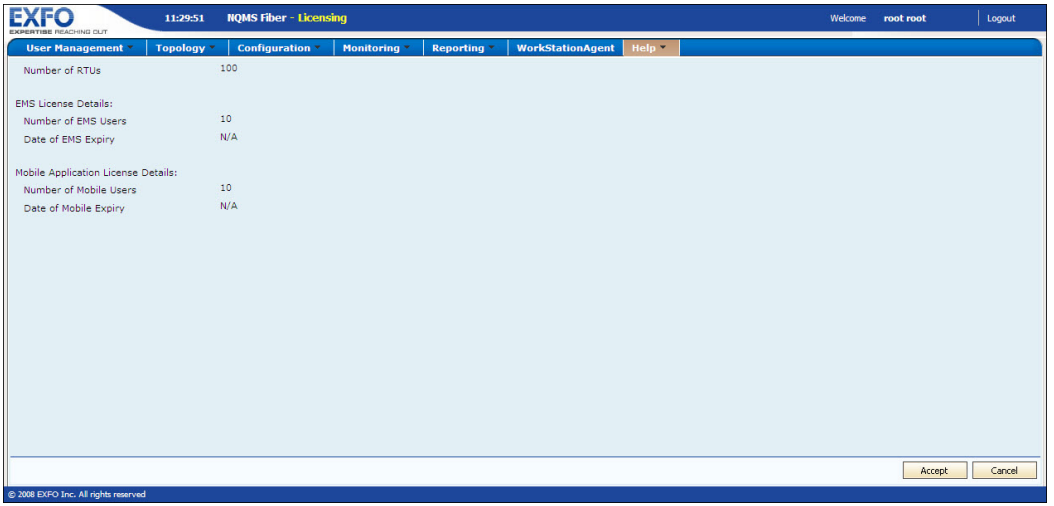
4. Click the **Browse** button. Select the new license file (.lic file) provided by EXFO and click **Open**.



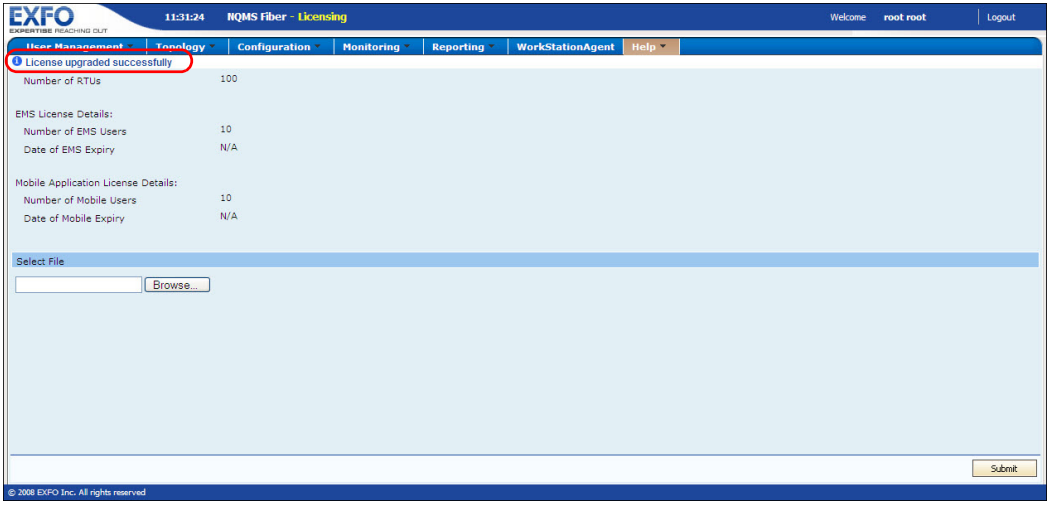
5. Click **Submit**. The licensing page loads and displays data for the following:

   - **Number of RTUs**
   - **EMS License Details (Number of Users, Date of EMS Expiry)**
   - **Mobile Application License Details (Number of Mobile Users, Date of Mobile Expiry)**

Note: *The **Mobile Application Licence Details** are displayed only if you buy a valid license for the Mobile Application feature.*



6. Click **Accept** to save the data, or **Cancel** to discard it.

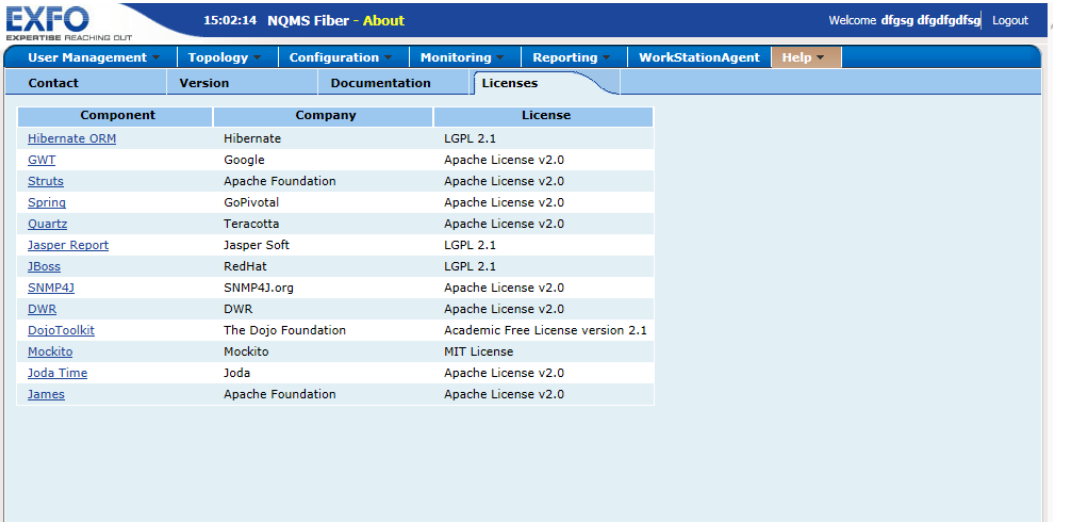


The license is upgraded successfully and authorized users can now log into the system.

Viewing the License

To view the licensing information:

1. From the **Help** menu, select **About**.
2. Click on the **Licenses** tab to display the list.
3. Click the link corresponding to the license that you want to view.



11 Reports

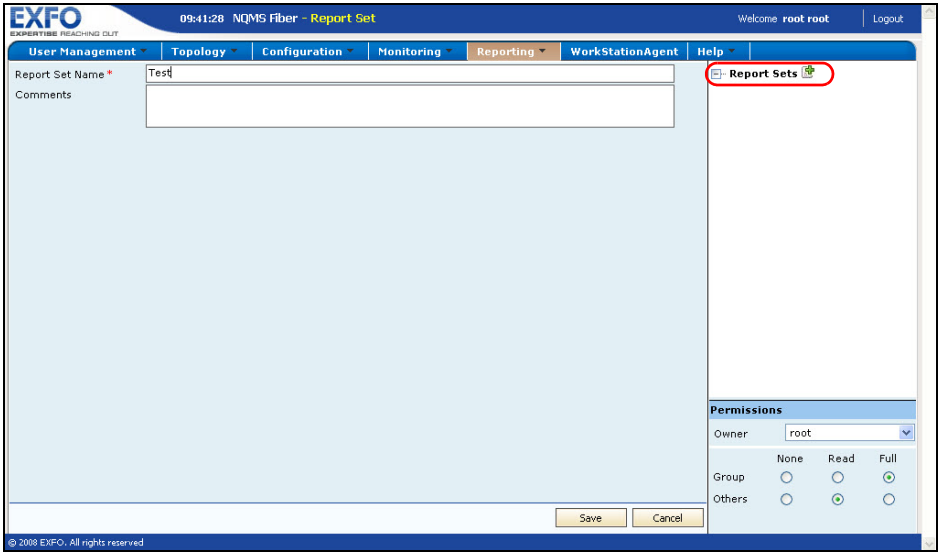
Creating Reports

You can generate reports about the current and historical status of the fiber network or of the system, you can also view and export in various formats. You can also create report sets in which you can include multiple reports. Reports can be created using different parameters for different time periods according to your requirements.

You can create a report schedule for the various reports and view them regularly over a period of time.

To create a report set:

1. From the **Reporting** menu, select **Reports**.
2. Click next to **Report Sets**.

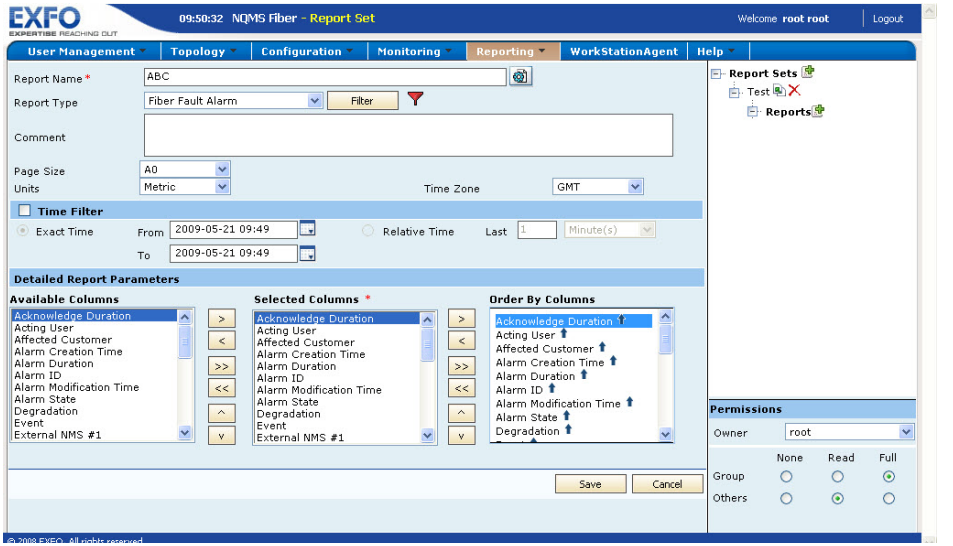


3. Fill out the required information:
   - **Report Set Name**
   - **Comments**

4. Click **Save** to apply your changes, or **Cancel** to discard them.

To create a report from a report set:

1. From **Reports,** click the report set for which you want to add a report.
2. Click next to **Reports**.

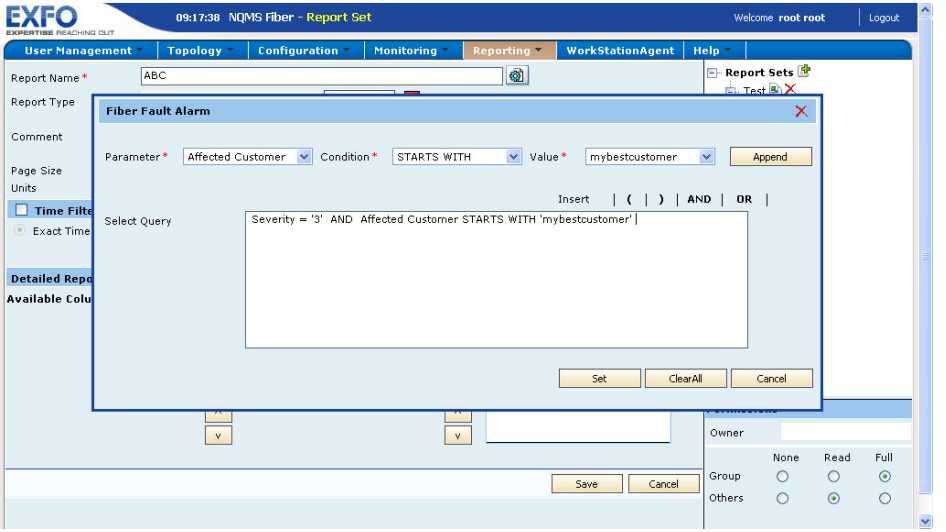


3. Enter a name for the report.

4. Define a report type as follows:

4a. Select the report type from the list.

4b. Provide filter conditions to view reports only for a specific criteria.



For example, to generate a report for an RTU alarm whose severity is high, you can specify filter parameters as shown in the table below:

Filter Criteria	Values
Report Type	**Fiber Fault Alarm**
Parameter	**Severity**
Condition	**= operator**
Value	**High**

Note: *The severity levels are defined as Low=1, Medium= 2, High = 3 in this GUI.*

4c. Click **Append,** select **AND**.

Filter Criteria	Values
Report Type	**Fiber Fault Alarm**
Parameter	**Affected customer**
Condition	**STARTS WITH**
Value	**mybestcustomer** (user)

4d. Click **Set** to save the query or **Clear All** to remove it.

5. If desired, enter comments.

6. If desired, modify the page size.

Metric Name	Metric Size (mm)	U.S.Equivalen (inches)
A4	210 x 297	8.3 x 11.7
A3	297 x 420	11.7 x 16.5
A2	420 x 594	16.5 x 23.4
A1	594 x 841	23.4 x 33.1
A0	841 x 1189	33.1 x 46.8

7. Select the preferred unit system to display distance data in the AW windows.

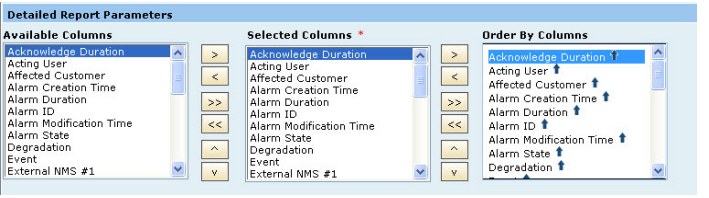
8. Select the preferred time zone that will be used to display the date in the AW windows.

9. Under **Time Filter**, select the **Exact Time or Relative Time** for which you want the report to be generated.

10. Define report parameters as follows:

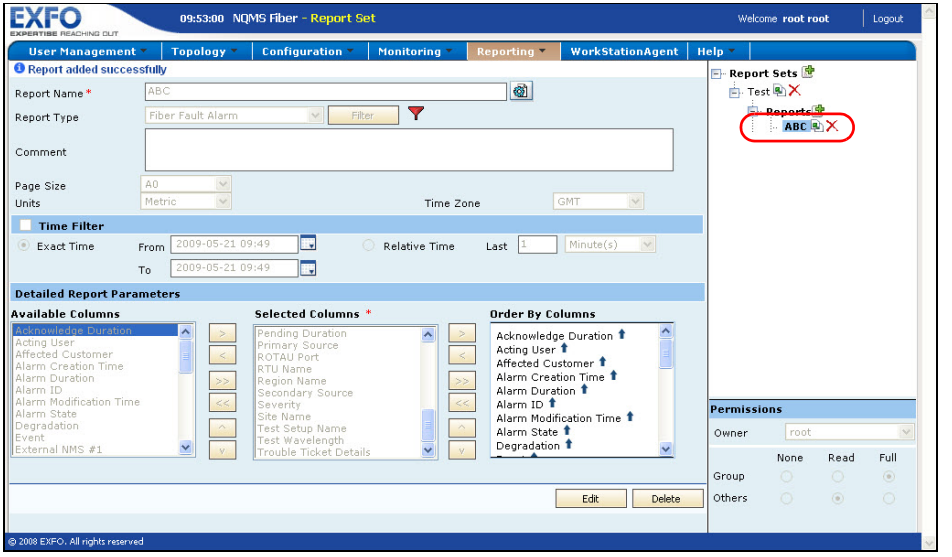
10a. Under **Detailed Report Parameters**, from the Available Columns list, select the report parameters.

10b. Sort the parameters in the order you want to see them displayed in the report.



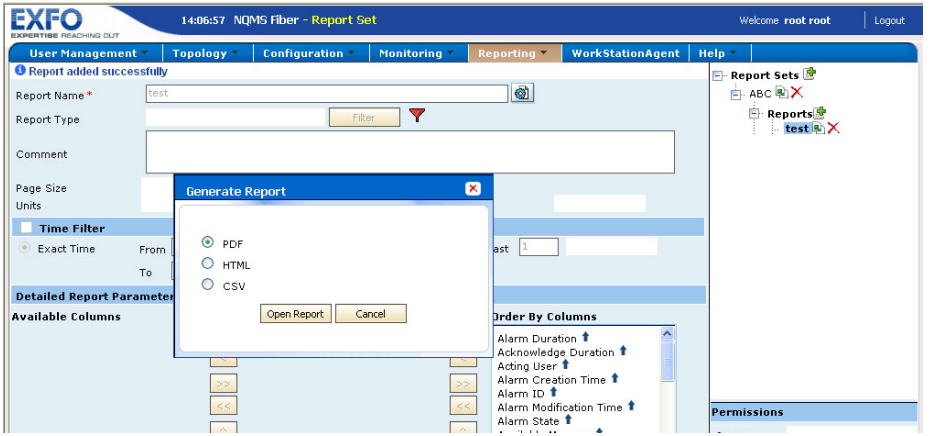
11. Click **Save** to apply your changes, or **Cancel** to discard them.

12. The newly created report is displayed under reports on the right.

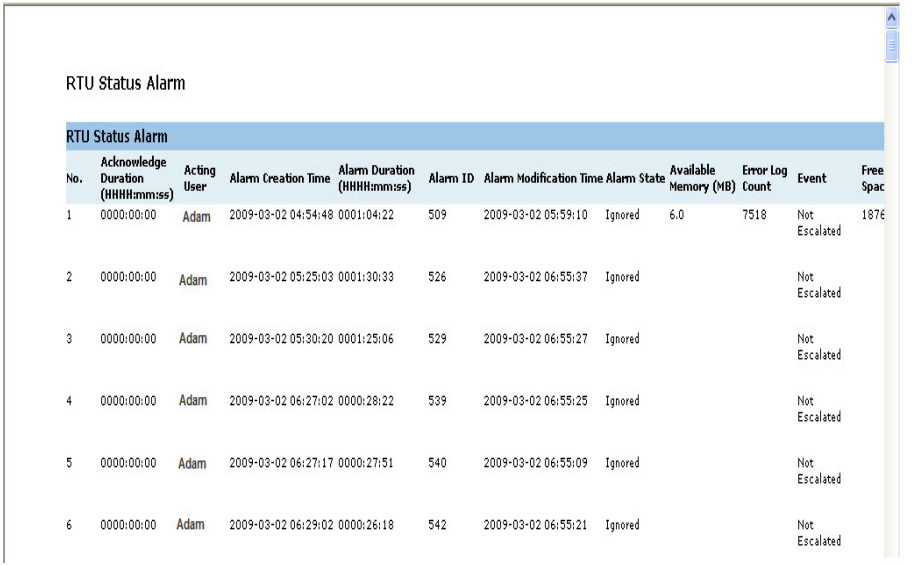


To view a report:

1. From **Reports,** click the report set for which you want to view.
2. From the tree view, select the report. The information about the report is displayed.
3. Click to generate the report. The **Generate Report** box is displayed.
4. Select **PDF**, **HTML**, or **CSV** and click **Open Report**.



5. A new window opens and the report is displayed in the selected format.



RTU Status Alarm

RTU Status Alarm

No.	Acknowledge Duration (HHHH:mm:ss)	Acting User	Alarm Creation Time	Alarm Duration (HHHH:mm:ss)	Alarm ID	Alarm Modification Time	Alarm State	Available Memory (MB)	Error Log Count	Event	Free Spac
1	0000:00:00	Adam	2009-03-02 04:54:48	0001:04:22	509	2009-03-02 05:59:10	Ignored	6.0	7518	Not Escalated	1876
2	0000:00:00	Adam	2009-03-02 05:25:03	0001:30:33	526	2009-03-02 06:55:37	Ignored			Not Escalated	
3	0000:00:00	Adam	2009-03-02 05:30:20	0001:25:06	529	2009-03-02 06:55:27	Ignored			Not Escalated	
4	0000:00:00	Adam	2009-03-02 06:27:02	0000:28:22	539	2009-03-02 06:55:25	Ignored			Not Escalated	
5	0000:00:00	Adam	2009-03-02 06:27:17	0000:27:51	540	2009-03-02 06:55:09	Ignored			Not Escalated	
6	0000:00:00	Adam	2009-03-02 06:29:02	0000:26:18	542	2009-03-02 06:55:21	Ignored			Not Escalated	

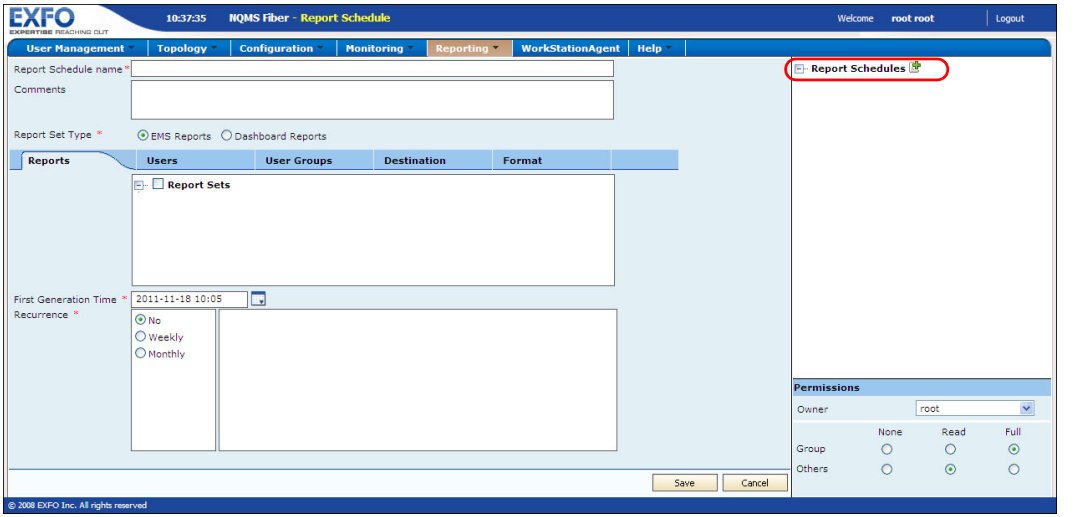
Configuring a Report Schedule

Report scheduling in NQMSfiber system refers to automatic generation of reports. It is meant as an alert to inform users regarding any activity on the system. Under report scheduling, you can specify when and how frequently you would like the report to be generated. The report may be scheduled to run at a preselected date/time. You can schedule EMS Reports and Dashboard Reports.

The report is generated from the server and users do not have to be connected to the system to receive the report.

To configure a report schedule:

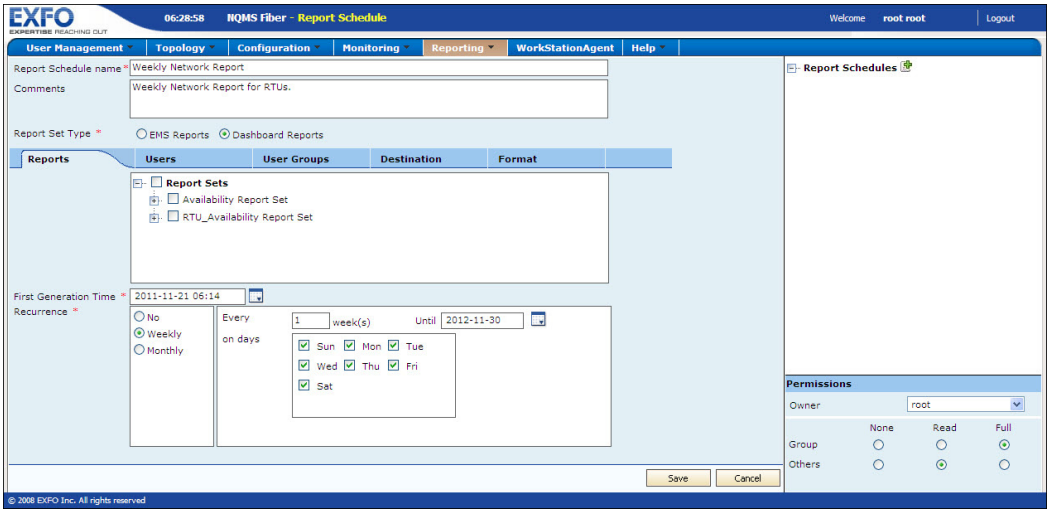
1. From the **Reporting** menu, select **Report Schedule**.
2. Click next to **Report Schedules**.



3. Fill out the required information:
   - **Report Schedule Name**
   - **Comments**

4. Select **Result Set Type** as **EMS Reports** or **Dashboard Reports**.

   The corresponding report sets are displayed. By default, **the EMS Reports option** is selected.



For more information on Dashboard, see *Using the Dashboard* on page 205.

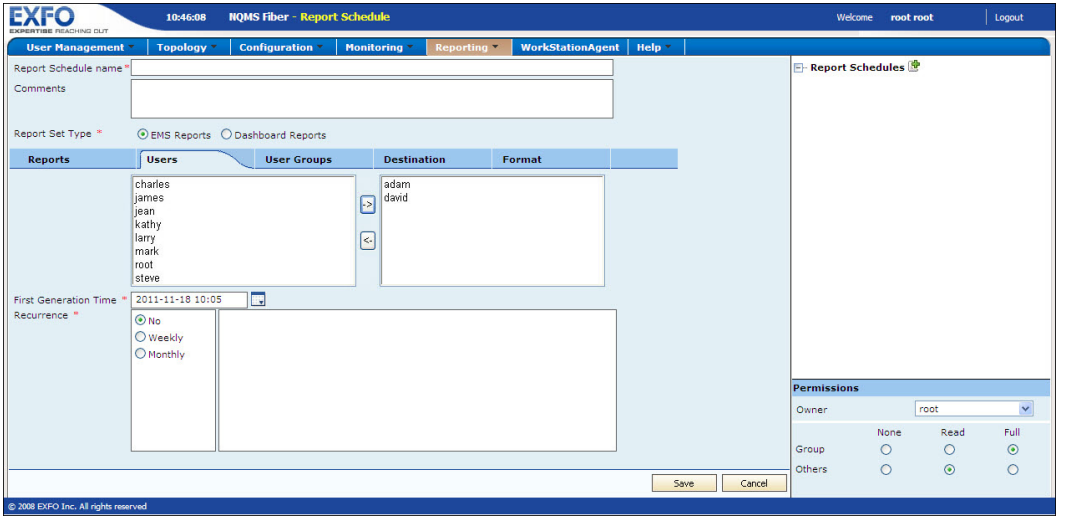
5. Under the **Reports** tab, select the following:

   - **Report Sets**: select the report set for which you want to generate reports.
   - **First Generation Time**: click to open the calendar, and select the date and time at which the report would be first generated.

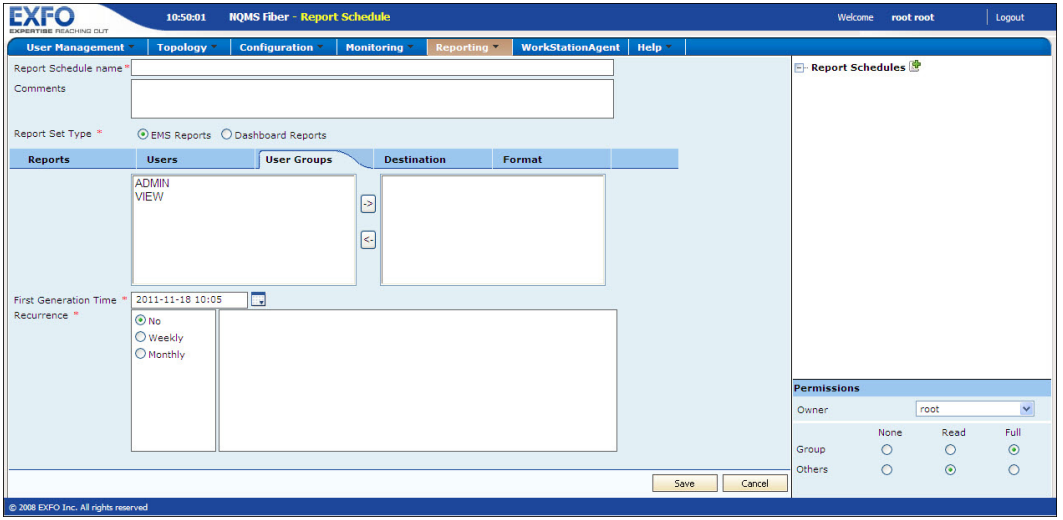
Note: *First generation time cannot be earlier than the system time.*

   - **Recurrence**: you can choose to view the same report regularly over a period of time, and select the frequency for which you want to view the report. You can choose the view the report every week or every month, based on the values selected.

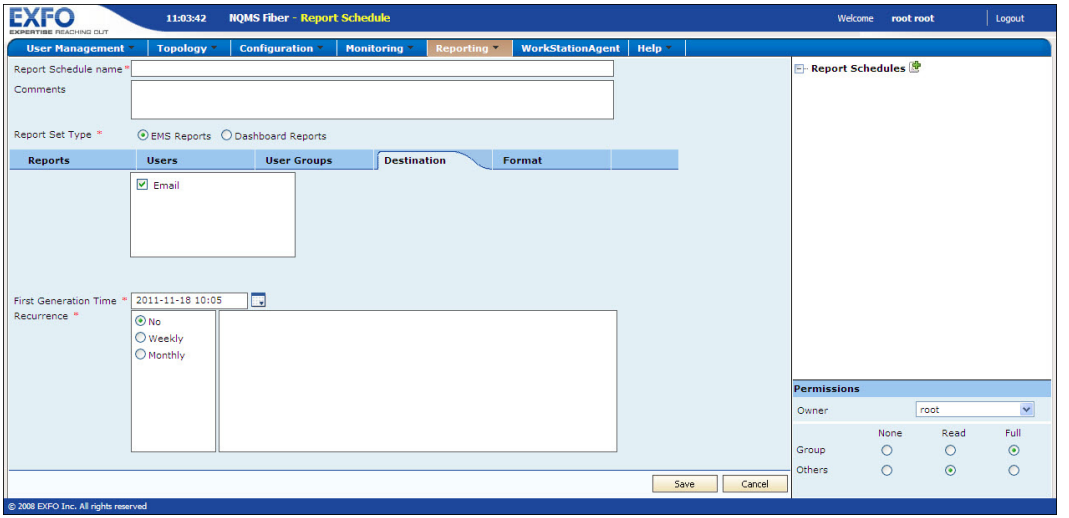
6. From the **Users** tab, select the users who will be notified about the report. You can also set the first generation time, and the frequency with which you want the report to reoccur.



7. From the **User Groups** tab, select the user group who will be notified about the report. You can also set the first generation time, and the frequency with which you want the report to reoccur.

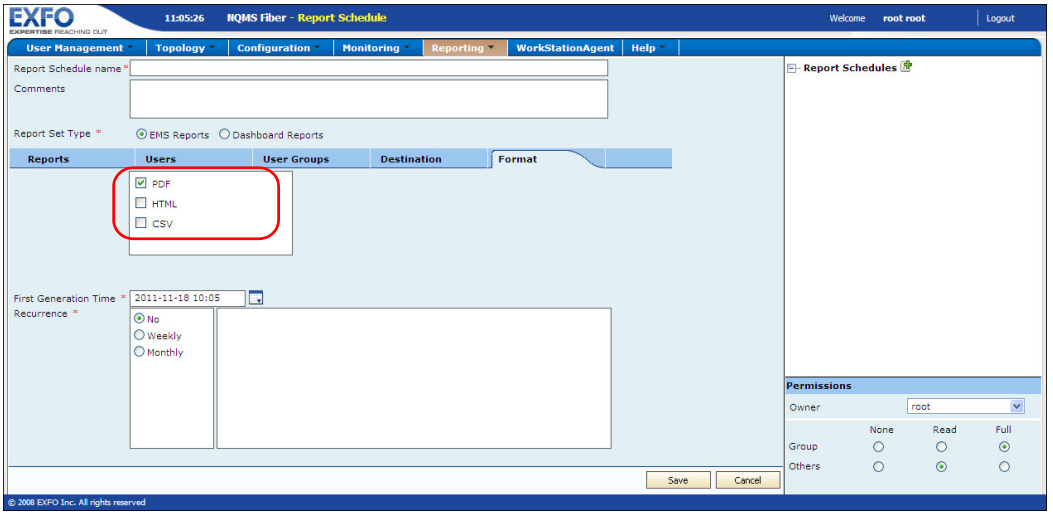


8. From the **Destination** tab, select the notification type for the reports. You can schedule the report to be sent to you mailbox every week, or every month.

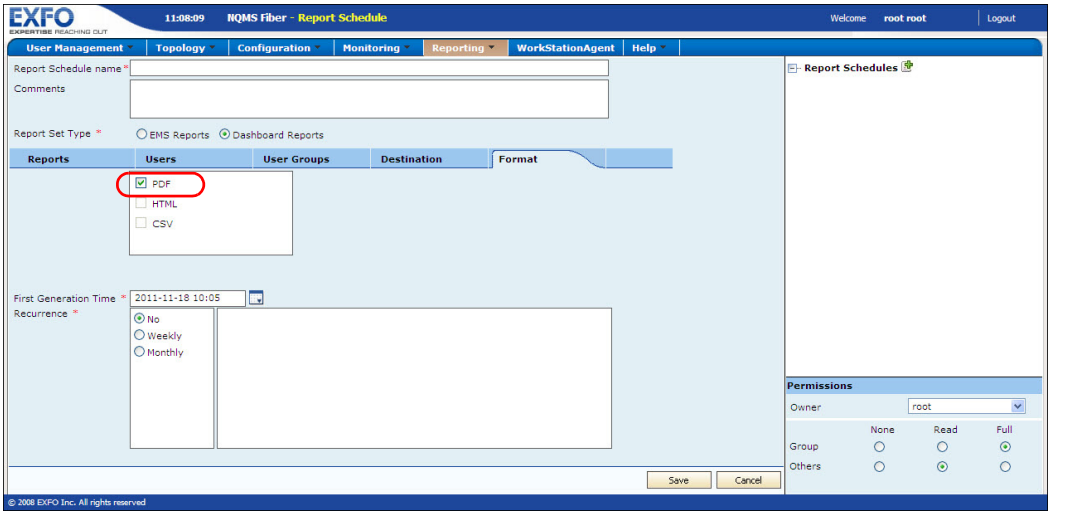


Note: *The email used here is not the email defined in the user/notification tab but in the user properties, general email address.*

9. From the **Format** tab, for the **EMS Reports** option select the format in which the report will be generated (either in PDF or HTML format).



For the **Dashboard Reports** option, the report set can be generated only in **PDF** format.



By default, the report is generated in A3 size and the maximum data limit for the report is 6 MB.

If the e-mail attachment exceeds 6 MB, an e-mail is sent to the user without the report set attachment. The e-mail will indicate that the report set attachment has exceeded the maximum limit. The e-mail also displays the names of the reports.

10. Click **Save** to apply your changes, or **Cancel** to discard them.

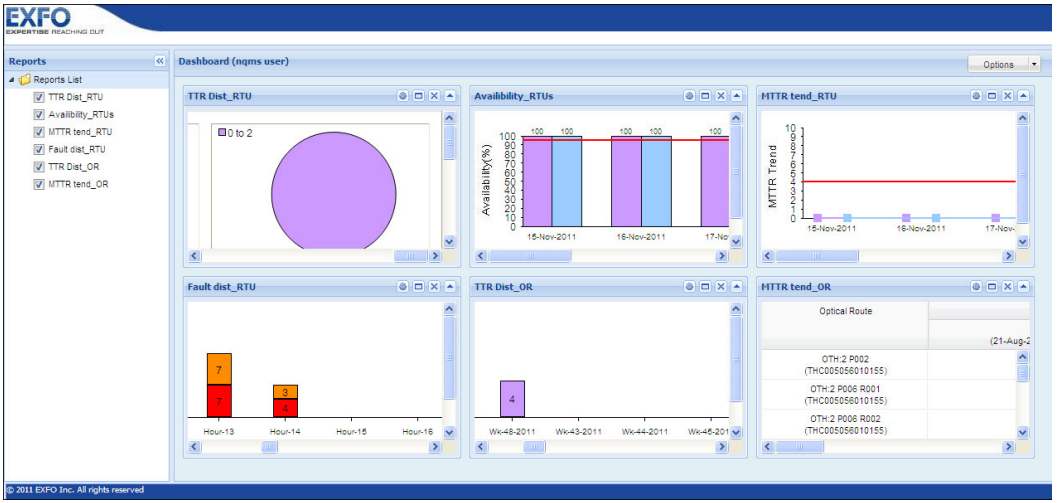
12 Using the Dashboard

The Dashboard provides statistical information about the performance of the Fiber Optic Network and System based on the alarms. In the Dashboard, you can configure reports to analyze the performance of a particular region, RTUs, and optical routes. The Dashboard provides the users and higher management with information about how the system and network are performing. This information is a based on the Service Level Agreement (SLA) and can help you further analyze the problem area and improve the network availability, reliability, and compliance. In the Dashboard, you can create widgets and select parameters to display the reports in Line, Bar, Pie, and Bar graphs.

The Dashboard screen includes the following sections:

- Report List: Contains user-defined list of reports.
- Dashboard: Displays widgets for the selected reports. The Dashboard also displays the first name and last name of the user.
- Options: Contains options to customize reports.

When you access Dashboard, NQMSfiber opens a separate session. The following screen displays an example of the Dashboard screen.



Creating a Widget

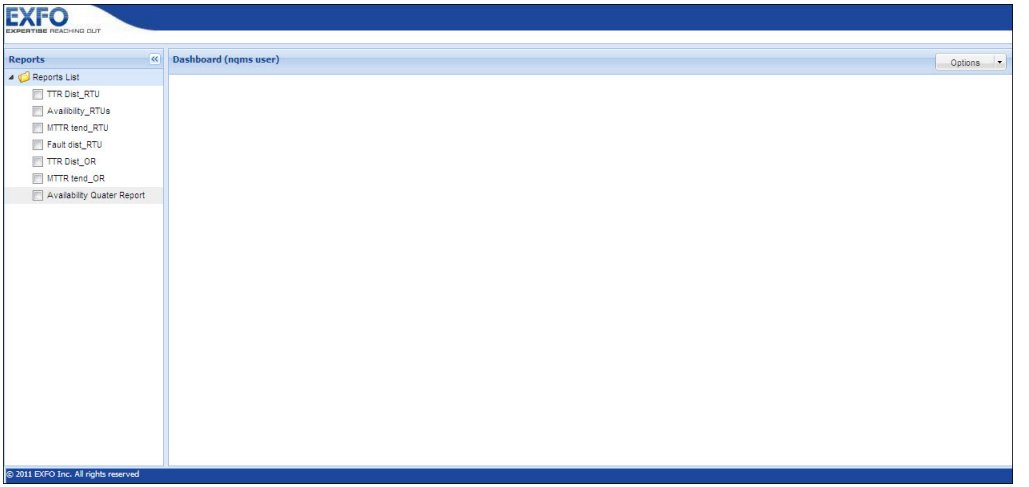
You can create a new widget to configure reports. By default, the new widget is blank. From the widget, using the **Configure Report** form, you can configure the report parameters.

You can display a maximum six widgets in the Dashboard. If you want to display more than six widgets, you need to close an existing widget.

To create a widget:

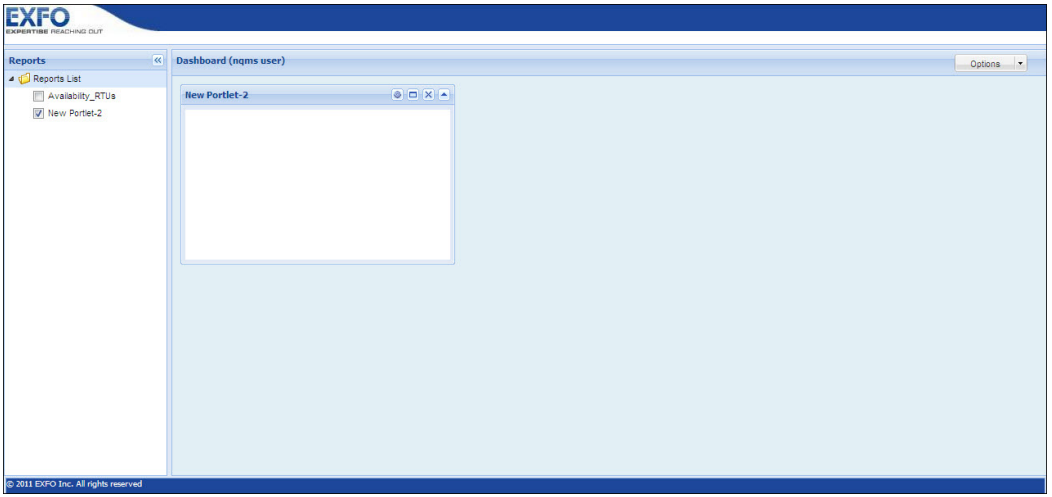
1. From the **Reporting** menu, select **Dashboard**.

   The **NQMS Reports** page is displayed.



2. In the **Reports** section, right-click **Reports List** and select **New Report**.

   A new widget is created and displayed in the **Dashboard** section.



   You can configure a report and display it in the Dashboard section. To configure a report, on the widget, click the **Configure** icon.

   For more information on configuring a report, see *Configuring a Report* on page 208.

Note: *You cannot refresh a widget (report data) by pressing F5 on your keyboard. To refresh the widget, close the widget and reopen it.*

Configuring a Report

Based on your selections, the report is generated as a chart and displayed in the widget. You can generate four types of charts such as Line, Bar, Grid (tabular), and Pie.

Each time you open the Dashboard from EMS, the report captures the updated data as per the current date and displays the chart. When you select a date range, the report is updated every time you open the Dashboard.

Note: *Mandatory items are identified by a red asterisk (*).*

Report Type Options

The following report type options are displayed in the **Report Type** list.

- **Availability:**

  This provides availability of the system or fiber optic network in the form of percentage. For example, if the availability is 99 %, then the system or fiber network's availability or working percentage is 99. It is calculated using elapsed time and down time of the system or fiber network.

  Based on your selection in the **Group By** and **Period** list, the down time is calculated.

  For example, if the following parameters are selected in the configuration form:

  - Period = 1 week
  - Aggregation = Region
  - Group by = None
  - Elapsed time = 10080 minutes (7*24*60)
  - Downtime = 3000 minutes

To calculate downtime, for example, if you have five RTUs and each RTU has five Optical Routes (ORs) then, you have total 25 ORs. Out of these 25 ORs, if ten ORs are down for 50 hours, then total down time for ten ORs is 50 hours, which is equal to 3000 minutes.

Network Availability Percentage = {(Elapsed time * total number of ORs) - Downtime/(Elapsed time * total number of ORs)} x 100.

Let us calculate the Network Availability Percentage based on the parameters that we have selected in the example.

Network Availability Percentage = {(10080*25) - 3000/(10080*25)} x 100 = 98.81%.

➤ **MTTR:**

The Mean Time To Repair (MTTR) is the average time required to repair the RTU or fiber fault. MTTR is calculated using Total Downtime and Number of failures over selected period of time. The MTTR helps you to understand whether the time taken to repair a fault is exceeding the Service Level Agreement (SLA) time committed to the customer.

For example, if the following parameters are selected in the configuration form:

- ➤ Period = 1 Week
- ➤ Aggregation = Region
- ➤ Group by = None
- ➤ SLA - 6 hours

For example, a region has total 20 RTUs and each RTU has 10 ORs.

Hence, total ORs = 200.

For example, let us assume that there are a total of 10 fiber fault alarms for the selected period which is resolved in the same period and the total downtime for the 10 alarms is 50 hours.

MTTR = (Total downtime time) / (Number of failures)

=50/10

=5 hours

➤ **TTR Distribution:**

Time To Resolve (TTR) represents the time taken by an individual alarm to be resolved. The TTR report presents the number of alarms resolved in defined time bands, selected over a period of time. You can define the band and time period and calculate the number of alarms resolved in this time period.

For example, if the following parameters are selected in the configuration form:

- Period = 1 Week
- Aggregation = Region
- Group by = None

For example, a region has total five RTUs and each RTU has 10 ORs.

Hence, total ORs = 50.

There are total five fiber fault alarms for the selected period which are resolved in the same period.

If the total downtime for the five alarms is 30 hours with the following TTR:

- Alarm 1 = 5 hours
- Alarm 2 = 3 hours
- Alarm 3 = 8 hours
- Alarm 4 = 10 hours
- Alarm 5 = 4 hours

If you select the TTR Distribution option as the report type, in the **Configure Report** form, the **Edit TTR Distribution** table is displayed in which you can edit the TTR distribution matrix. Select and configure the **From** and **To** hours in the TTR distribution matrix.

To delete a TTR distribution, select the check box corresponding to the distribution that you want to delete and click **DELETE**. The default TTR distribution values in a Grid format are as follows:

From Hours	To Hours	Alarms
0	2	0
2	4	2
4	6	1
6	∞	2

Note: *The value in the **From** field will always be less than the value in the **To** field. The **From** field value of last row will be same as the value in the **To** field of the next row. By default, the value in the **To** field of last row is ∞ (Infinity).*

OR

You can edit the TTR distribution matrix from the Global Settings. For more information on global settings, see *Configuring Global Settings* on page 233.

➤ **Fiber Fault Alarm Distribution:**

This is a graphical representation of the total number of alarms based on the alarm severity you select. The alarms are categorized as High, Medium, and Low severity alarms. The alarms that occur between selected period are considered.

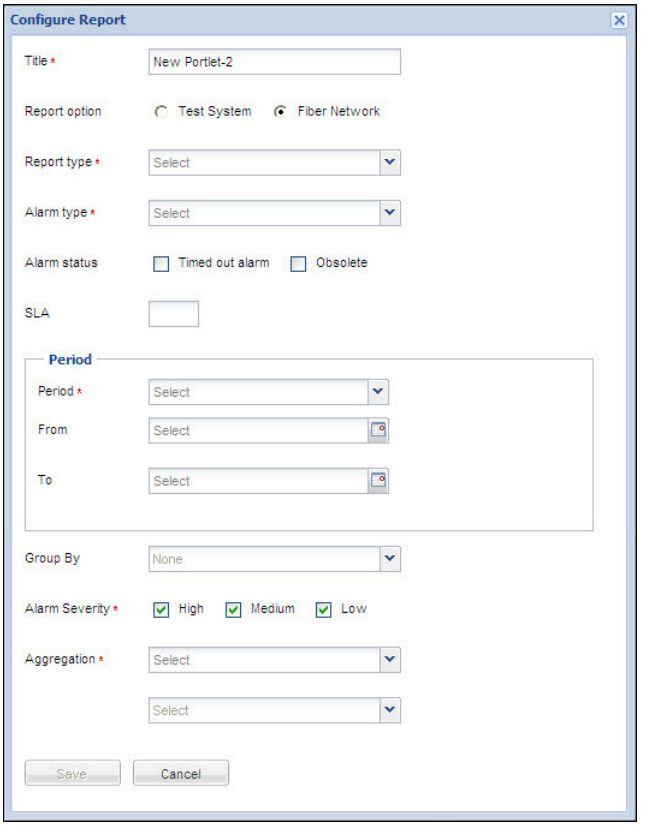
The following table displays report types applicable for **Test System** and **Fiber Network**.

Test System	Fiber Network
Availability	Availability
MTTR Trend	MTTR Trend
Fiber Fault Alarm Distribution	TTR Distribution
	Fiber Fault Alarm Distribution

To configure a report:

1. On the widget, click the **Configure** icon to configure a report.

The **Configure Report** form is displayed.



2. In the **Title** box, enter a title for the report.

The title is displayed on the widget title bar and in the **Reports List**. You can only enter a maximum of 50 characters.

3. In **Report option**, select the **Test System** or **Fiber Network** option.

   To view reports for RTUs, select **Test System**. To view the report for the Fiber Optic Network, select **Fiber Network**.

   When you select **Test System** or **Fiber Network**, the **Configure Report** form allows you to select a specific configuration to generate a report. For more information on configuration matrix of test system and fiber network, see *Configuration Matrix* on page 219.

4. Select the report type you want to use. For more information on report types, see *Report Type Options* on page 208.

5. In the **Alarm type** list, select the type of alarm for which you want to generate the report.

   This is a list of all the user defined alarms that are created in EMS.

6. Select the **Alarm Status** as **Timed out alarm** or **Obsolete**.

   By default, if you do not select any alarm status the alarms are not considered while generating the report.

7. Enter the **SLA** (Service Level Agreement). The SLA numeric value is for the particular report type that you select. SLA is applicable only for the Availability and MTTR Reports. By default, when you select TTR Distribution and Fiber Fault Alarm Distribution, the SLA field is disabled. For Availability, the SLA value is positive and up to three decimal places and for MTTR trend, the SLA value is positive and up to two decimal places. The SLA line is displayed on the graph. Place the mouse over the SLA line to view the value. The following SLA units are considered based on the selection:

Report Type	SLA Unit
Availability	%
MTTR Trend	Hours
TTR Distribution	Not applicable
Fiber Fault Alarm Distribution	Not applicable

8. From the **Period** list, select the duration for which you want to generate the report.

When you select the **Date Range** option, you can select the duration using **From** and **To** dates. If you select any option other than **Date Range**, the **From** and **To** date fields are disabled.

9. In the **From** and **To** dates, select the date range for which you want to generate the report.

By default, when you select an option from the **Period** list other than **Date Range**, the **To** date displays the current date. When you select the **Date Range** option in the **Period** list, you can select any start and end date.

10. From the **Group By** list select the option to group the report. You can group the report in one of the following ways:

By default, **None** is selected. Based on the option that you select, the group by options are displayed.

The **Hour** option is displayed only if you select **Day** option in the **Date Range** field. The following table displays the group by options displayed based on the option that you select in the **Period** list.

Period Option	None	Hour	Day	Week	Month	Quarter	Year
Date Range = 1 day	✓	✓	X	X	X	X	X
Last 1 week	✓	X	✓	X	X	X	X
Last 1 Month	✓	X	✓	✓	X	X	X
Last 1 Quarter	✓	X	X	X	✓	X	X
Last 6 Months	✓	X	X	X	✓	✓	X
Last 1 Year	✓	X	X	X	✓	✓	X
Date Range (more than 1 year)	✓	X	X	X	X	X	✓

The following table displays the group by options displayed if you select the **Date Range** option in the **Period** list.

Difference between **From** and **To** date	Group By option
1	Hour
2-7	Day
8-30	Day and Week
31-90	Week and Month
91-180	Month and Quarter
>180	Month and Quarter

11. Select the **Alarm Severity** as **High**, **Medium**, or **Low**.

Alarms with the selected severity are used for the calculation. You can also select a combination of options.

12. From the **Aggregation** list, select the appropriate parameter.

- If you select **Region**, a region list is displayed in the **Select Aggregation Values** area. Select the region for which you want to view the report. You can select multiple regions.
- If you select **RTU**, a region list with all the RTUs is displayed in the **Select Aggregation Values** area. Select the RTUs for which you want to view the report. You can select multiple RTUs.
- If you select **Optical Network**, a list of regions, corresponding RTUs, and the optical routes for each region are displayed in the **Select Aggregation Values** area. Select the optical routes for which you want to view the report. You can select multiple optical routes.
- If you select **Customer**, a customer list is displayed in the **Select Aggregation Values** area. Select the customer for which you want to view the report. You can select multiple customers.

The RTU (new or old) is displayed only when an optical route(s) is detected and the RTU is synchronized with EMS. If an optical route(s) is not detected, the RTU for which optical routes are not present will not be shown on the generated dashboard report, in the **Select Aggregation Values** area, since there are no alarms.

In the case of **Region**, if the RTU is associated with the region then it would be shown in the **Aggregation** values of the Configure Report.

13. From the **Default View** list, select the type of graph with which you want to view the report.

If you select **Test System** in the Report type list, the dashboard generates the following graph types:

		Grid	Bar	Line	Pie
Report Type	Availability	✓	✓	✓	X
	MTTR Trend	✓	✓	✓	X
	Fiber Fault Alarm Distribution	✓	✓	X	✓

OR

If you select **Fiber Network** in the Report type list, the dashboard generates the following graph types:

		Grid	Bar	Line	Pie
Report Type	Availability	✓	✓	✓	X
	MTTR Trend	✓	✓	✓	X
	TTR Distribution	✓	✓	X	✓
	Fiber Fault Alarm Distribution	✓	✓	X	✓

For more information on Grid, Bar, Line, Pie, and Stacked Bar Layouts, see *Grid Layout* on page 221, *Bar Layout* on page 222, *Stacked Bar Layout* on page 223, *Line Chart Layout* on page 224, *Pie Chart Layout* on page 225.

14. Click **Save** to apply your changes or **Cancel** to discard them.

A confirmation message is displayed.

15. Click **OK**.

The report is configured, saved, and displayed in the Dashboard section. There are options that are available for every report that allow you to customize the report. For more information on the dashboard options, see *Report Dashboard Options* on page 226.

Note: *You can select the widgets that you want to view in the Dashboard section. In the **Reports List**, select the check box corresponding to the report that you want to display in the dashboard.*

Note: *Click the **Edit** button to edit the configuration report and then click **Save**.*

Configuration Matrix

The following table displays the configuration parameter form for the **Test System** option.

Report Type	Period	Group By	Alarm Severity	Aggregation	Default View
Availability	Date Range, Last 1 week, Last 1 Month, Last 1 Quarter, Last 6 Months, Last 1 Year	None, Hour, Day, Week, Month, Quarter, Year	High, Medium, Low	Region or RTU	Grid, Bar, and Line
MTTR	Date Range, Last 1 week, Last 1 Month, Last 1 Quarter, Last 6 Months, Last 1 Year	None, Day, Week, Month, Quarter, Year	High, Medium, Low	Region or RTU	Grid, Bar, and Line

Report Type	Period	Group By	Alarm Severity	Aggregation	Default View
Fault Distribution	Date Range, Last 1 week, Last 1 Month, Last 1 Quarter, Last 6 Months, Last 1 Year	None, Hour, Day, Week, Month, Quarter, Year	High, Medium, Low	Region or RTU	Grid, Bar, and Pie

The following table displays the configuration parameter form for the **Fiber Network** option.

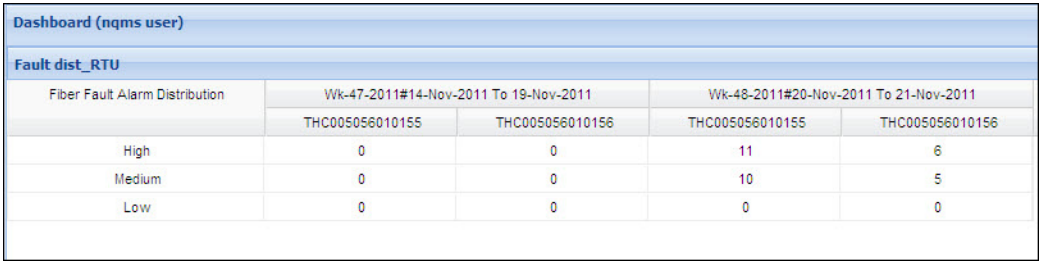
Report Type	Period	Group By	Alarm Severity	Aggregation	Default View
Availability	Date Range, Last 1 week, Last 1 Month, Last 1 Quarter, Last 6 Months, Last 1 Year	None, Hour, Day, Week, Month, Quarter, Year	High, Medium, Low	Region, RTU, or Customer	Grid, Bar, and Line
MTTR	Date Range, Last 1 week, Last 1 Month, Last 1 Quarter, Last 6 Months, Last 1 Year	None, Day, Week, Month, Quarter, Year	High, Medium, Low	Region, RTU, or Customer	Grid, Bar, and Line
TTR Distribution	Date Range, Last 1 week, Last 1 Month, Last 1 Quarter, Last 6 Months, Last 1 Year	None, Day, Week, Month, Quarter, Year	High, Medium, Low	Region, RTU, or Customer	Grid, Bar, and Pie

Report Type	Period	Group By	Alarm Severity	Aggregation	Default View
Fault Distribution	Date Range, Last 1 week, Last 1 Month, Last 1 Quarter, Last 6 Months, Last 1 Year	None, Hour, Day, Week, Month, Quarter, Year	High, Medium, Low	Region, RTU, or Customer	Grid, Bar, and Pie

Grid Layout

A grid layout is in tabular format with labels for columns and rows as per the options that you select while configuring the report.

If you select the **Grid** chart layout in the **Default View** list, the data is displayed in a tabular format. For example, the following grid displays the Fiber Fault Distribution Report for selected date range and the selected RTUs.



Dashboard (nqms user)

Fault dist_RTU

Fiber Fault Alarm Distribution	Wk-47-2011#14-Nov-2011 To 19-Nov-2011		Wk-48-2011#20-Nov-2011 To 21-Nov-2011	
	THC005056010155	THC005056010156	THC005056010155	THC005056010156
High	0	0	11	6
Medium	0	0	10	5
Low	0	0	0	0

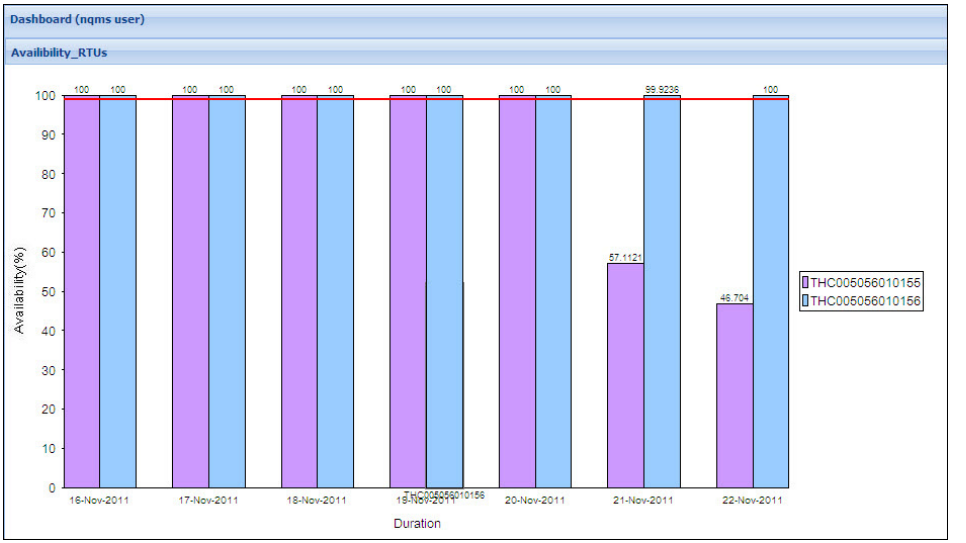
Bar Layout

The X and Y axis display label and scale values as per the options that you select while configuring the report.

The graph displays the corresponding value for each bar generated on the Y-axis. The values of the bar are displayed corresponding to Y-axis.

If you select the **Bar** chart layout in the **Default View** list, the data is displayed in a bar format. For example, the following bar chart displays the Availability Report for the last one week for the selected RTUs.

Note: *If there is no data available for the selected configuration, the bar chart is blank.*



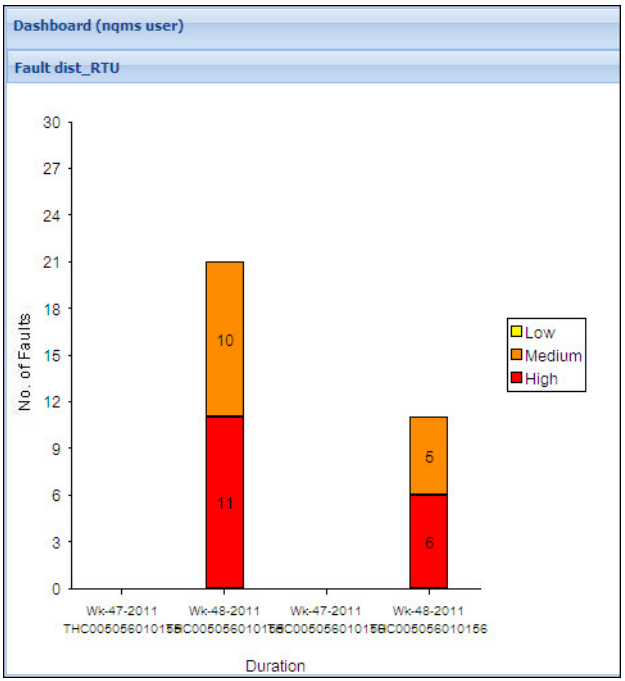
Stacked Bar Layout

The X and Y axis display label and scale values as per the options that you select while configuring the report.

The graph displays the corresponding value for each bar generated on the Y-axis. The values of the stack are displayed corresponding to Y-axis.

If you select the **Bar** chart layout in the **Default View** list, the data is displayed in a bar format. For example, the following stacked bar chart displays Fiber Fault Distribution stacked bar chart for the selected date range and the selected RTUs. A stacked layout is only applicable to **TTR Distribution** and **Fiber Fault Distribution** report type.

Note: *If there is no data available for the selected configuration, the stacked bar chart is blank.*

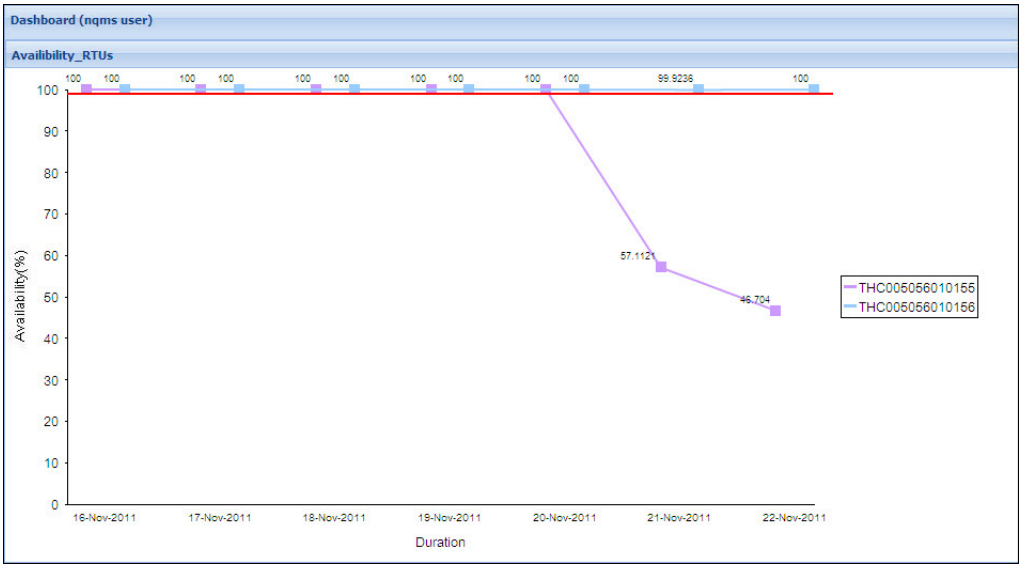


Line Chart Layout

The X and Y axis display label and scale values as per the options that you selected while configuring the report.

The graph displays the corresponding value for each line generated on the Y-axis. The values of the points on the line are displayed corresponding to Y-axis.

If you select the **Line** chart layout in the **Default View** list, the data is displayed in a line format. For example, the following line chart displays the Availability for the last one week for the selected RTUs.



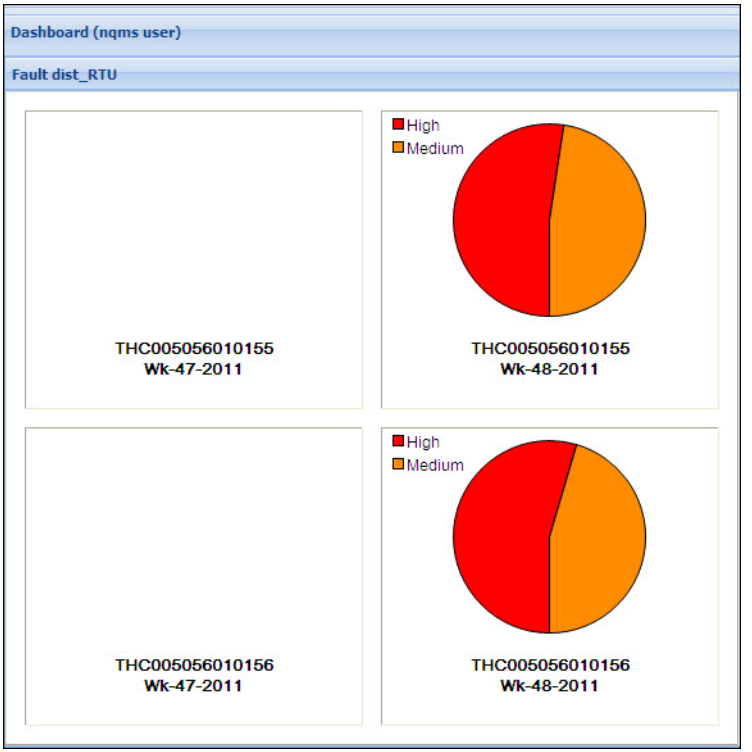
Pie Chart Layout

The X and Y axis display label and scale values as per the options that you select while configuring the report.

The graph displays the corresponding value for each section of the pie.

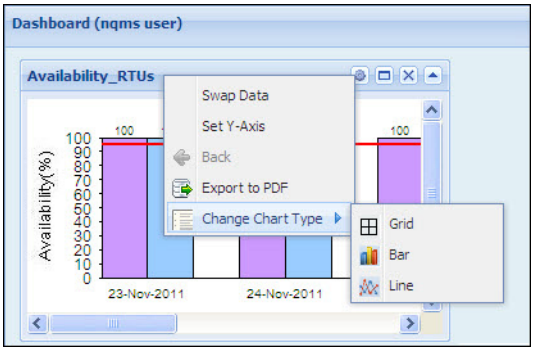
If you select the **Pie** chart layout in the **Default View** list, each section of the pie is displayed. For example, the following pie chart displays the Fiber Fault Distribution for the selected date range and the selected RTUs.

Note: *If there is no data available for the selected configuration, the pie chart block is blank.*



Report Dashboard Options

On the widget, right-click title bar to view the options that are available for a report.



The following options to customize a report are available for a report:

Options	Description
Swap Data	On the Dashboard, right-click the widget for which you want to swap the data in the chart and click **Swap Data**. You can exchange data between **Aggregation** and **Group By** on the X axis for the displayed graph. This option does not swap data between the X and Y axis values. The **Swap Data** option is not available for Pie and Grid charts.

Options	Description
Set Y Axis Values	By default, the Y axis scaling values for Bar and Line charts are auto scaled. If you select TTR Distribution or Fiber Fault Distribution and the default view is stacked bar, the **Set Y Axis Values** option is not available. For the Availability and MTTR analysis type reports, Y-axis scaling is applicable only to the line and bar charts. Based on the values that you set for Y-axis, the values that are outside the scale are not displayed in the graph including the SLA line. You can edit the Y-axis scale for start, end, and incremental values. In the **Set Y'axis value** dialog box, enter the following information: ➤ In the **Min Value** box, enter the minimum value to be displayed on the Y-axis. ➤ In the **Max Value** box, enter the maximum value to be displayed on the Y-axis. ➤ In the **Increment By** box, enter the value with which you want to increment the values on the Y-axis. Click **Ok**.
Back	If you are using the drill down functionality for a report, click this option to go back to the previous report. This option is enabled only when you drill down a chart from the region to RTU or RTU to OR. For more information on the drill down of reports, see *Chart Drill Down* on page 244.
Export	Click this option to export the report in a PDF format. The **File Download** dialog box is displayed. To save the report, click **Save** and select the location where you want to save the file. OR To open the report, click **Open**.

Options	Description
Change Chart Type	You can change the display of the type of chart in the report. The options displayed are other than the chart type that is displayed. On the Dashboard, right-click the widget for which you want to change the chart type and click **Change Chart Type** > the chart type that you want to select.

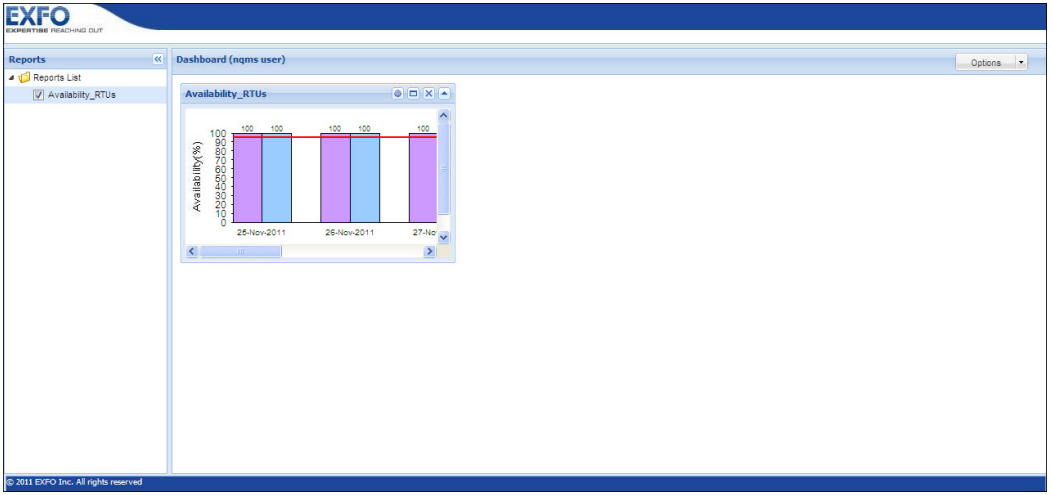
Cloning a Widget

You can create a clone of a widget that you created and modify the report configuration form. When you clone a widget, a copy of the existing widget is created and displayed in the Reports List. You cannot create a clone of a widget that is already cloned till you do not rename, edit, and save the widget.

To clone a widget:

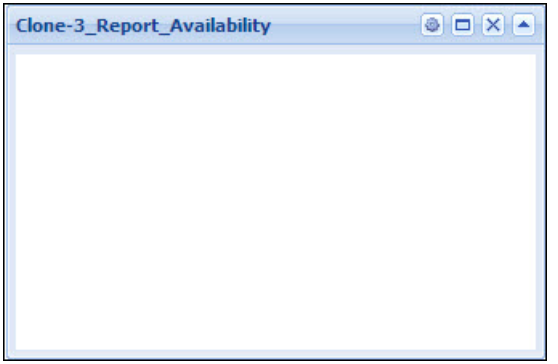
1. Select **Dashboard**.

   The NQMS Reports page is displayed.



2. In the **Reports List**, right-click the widget that you want to clone.
3. Click **Clone**.

In the Dashboard pane, a clone of the existing widget is created with a **Clone-** prefix.



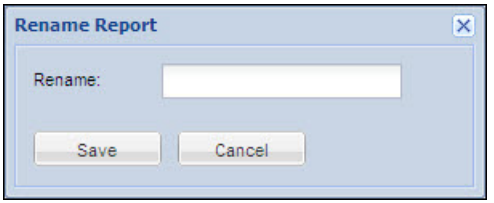
Renaming a Widget

You can rename a widget that you created. Enter up to 50 characters for the title of the report.

To rename a widget:

1. Select **Dashboard** which displays the NQMS Reports page.
2. In the **Reports List**, right-click the widget that you want to rename.
3. Click **Rename**.

   The **Rename Report** dialog box is displayed.



4. In the **Rename** box, type the new name for the report.
5. Click **Save** to apply the changes or **Cancel** to discard them.

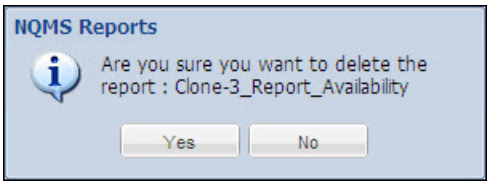
Deleting a Widget

You can delete a widget from Reports. When you delete a widget, it is deleted from **Reports List** and **Dashboard**.

To delete a widget:

1. Select **Dashboard** which displays the NQMS Reports page.The NQMS Reports page is displayed.
2. In the **Reports** pane, right-click the widget that you want to delete.
3. Click **Delete**.

   A confirmation message is displayed.



4. Click **Yes**.

   The widget is deleted.

Configuring Global Settings

You can configure the following global settings for reports:

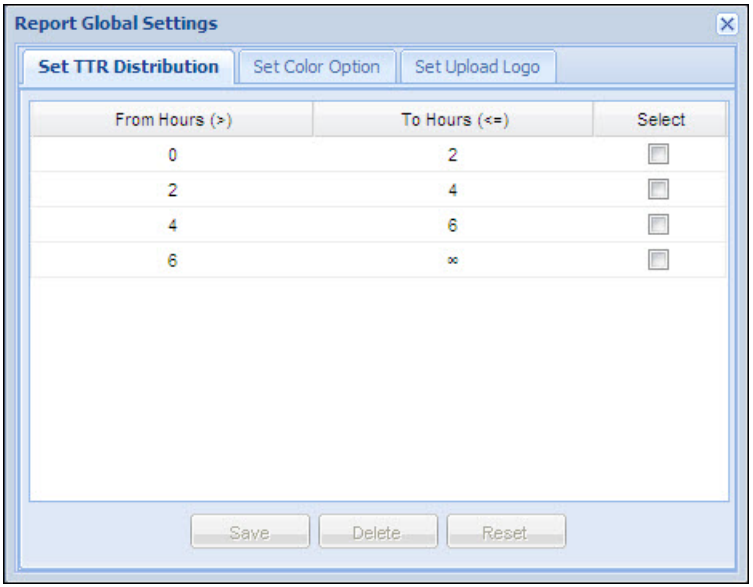
- **TTR Distribution**
- **Set Color Option**
- **Set Upload Logo**

These global settings are applied to all reports.

To configure global settings:

1. Select **Dashboard** which displays the NQMS Reports page.
2. On the **Dashboard**, click **Options** >**Setting**.

   The **Report Global Settings** dialog box is displayed. By default, the **Set TTR Distribution** tab is displayed.



The TTR distribution table displays the TTR distribution matrix. By default, the TTR distribution matrix values are applicable to all the widgets that you create. You can change the default values for an individual widget from the **Configure Report** form.

2a. Select and set the **From** and **To** hours in the TTR distribution matrix. The default TTR distribution values are as follows:

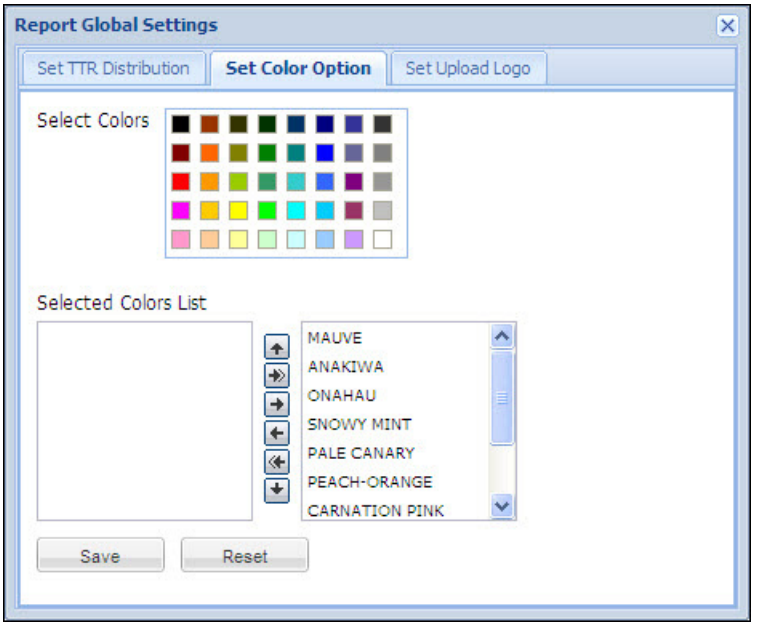
From Hours	To Hours
0	2
2	4
4	6
6	∞

Note: *The value in the **From** field will always be less than the value in the **To** field. The **From** field value of last row will be same as the value in the **To** field of the next row. By default, the value in the **To** field of last row is ∞ (Infinity).*

2b. Click **Save** to apply the changes or **Reset** to discard them.

Note: *To delete a TTR distribution, select the check box corresponding to the distribution that you want to delete and click **Delete**. You cannot delete all rows of the TTR Distribution. One row from 0-∞ always remains in the TTR Distribution.*

3. Select the **Set Color Option** tab.



You can set the color for the following report types from a list of pre-defined colors:

- Availability
- MTTR Trend
- TTR Distribution

You cannot set the color for the Fiber Fault Alarm Distribution report type. For the Fiber Fault Alarm Distribution report type, the following colors are fixed for all the applicable charts.

- High severity: Red
- Medium severity: Amber
- Low severity: Yellow

3a. From the **Select Color** palette, select the colors that you want to apply to the reports.

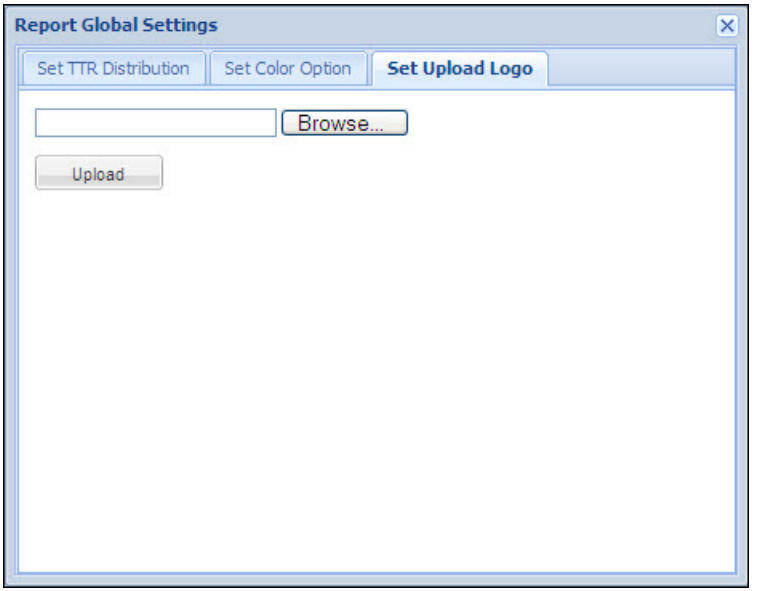
The colors that you select are displayed in the **Selected Color List**.

3b. Select the colors and click the icon to add the colors to the list and the icon to remove colors from the list.

Note: *To add all colors, click the* *icon and to remove all colors click the* *icon. To change the order of the colors, click the* *or* *icons.*

3c. Click **Save** to apply the changes or **Reset** to discard them.

4. Select the **Set Upload Logo** tab.



You can upload a logo for your report from your system.

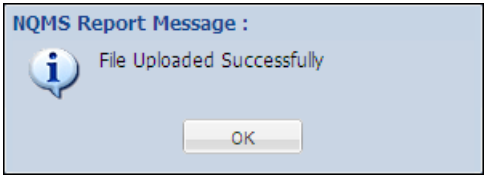
4a. To select a logo, click **Browse**.

4b. Select the file that you want to upload and click **Open**.

Note: *The NQMSfiber application supports jpg, bmp, jpeg, png, and gif picture formats.*

4c. Click **Upload**.

A confirmation message is displayed.



4d. Click **OK**.

The uploaded logo only appears in the report PDF. The logo is not displayed on the widget.

Creating a Dashboard Set

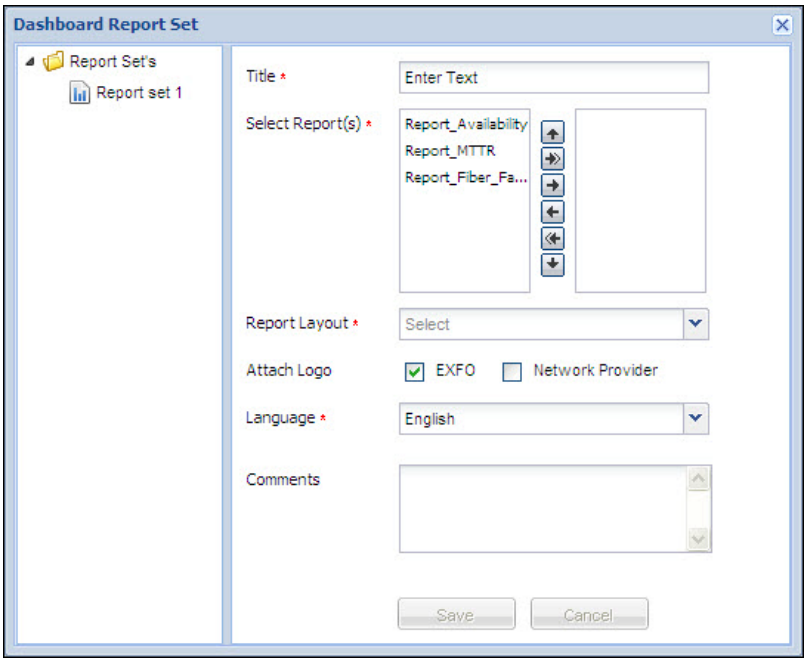
You can create a dashboard set with the reports that you have created in Dashboard.

Note: *Mandatory items are identified by a red asterisk (*).*

To create a dashboard set:

1. From the **Reporting** menu, select **Dashboard** which displays the NQMS Reports page.
2. On the **Dashboard**, under **Options**, click **Report Sets**.

   The **Dashboard Report Set** window is displayed.



3. In the **Title** box, enter a title for the report set.

   The title is displayed on the widget title bar and in the Report List. You can only enter up to 50 characters in this field.

4. In the **Select Report(s)** list select the reports that you want to add to the dashboard set and click the icon to add the report or the icon to remove a report from the right side list.

Note: *To add all reports, click the icon and to remove all reports. Click the icon. To change the order of the colors, click the or icons.*

5. In the **Report Layout** list, select the layout of the dashboard set as **Grid**, **Graph** or **Grid & Graph**.

6. Select the **Attach Logo** option as **EXFO** or **Network Provider**.

   The logo that you select is displayed on the report. By default, the **EXFO** check box is selected.

7. In the **Language** list, select the language in which you want to generate the report, as one of the following:

   - **English**
   - **Spanish**
   - **Russian**
   - **French**
   - **Czech**
   - **Chinese** (Simplified)

   By default, **English** is selected.

8. In the **Comments** box, enter comments about the report.

9. Click **Save** to apply the changes or **Cancel** to discard them.

Note: *To edit a dashboard report set, right-click the report set that you want to edit and click **Edit Report Set**.*

You can now schedule the report in the **Reports** section in the EMS GUI. For more information on scheduling reports, see *Configuring a Report Schedule* on page 203.

Viewing a Dashboard Set

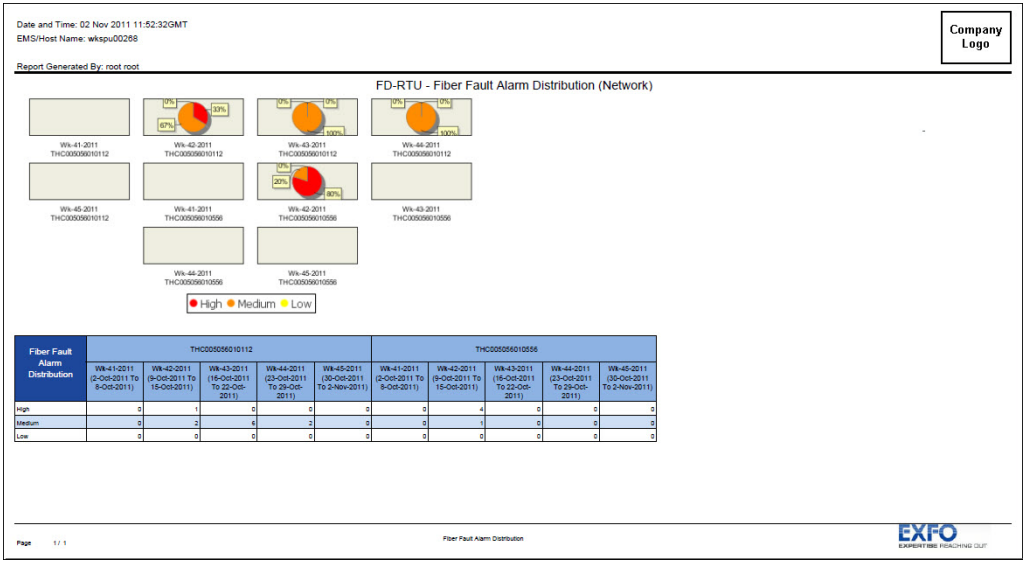
You can view the report of a dashboard set in a PDF format.

To view a dashboard set:

1. From the **Reporting** menu, select **Dashboard** which displays the NQMS Reports page.
2. On the **Dashboard**, under **Options**, click **Report Sets**.

   The **Dashboard Report Set** dialog box is displayed.
3. In the **Report Set's** list, right-click the report set that you want to view.
4. Click **View Report Set**.

   The report set is displayed in a PDF format. The following image displays an example of a report set.


Date and Time: 02 Nov 2011 11:52:32GMT
EMS/Host Name: wkspu00268

Company Logo

Report Generated By: root root

FD-RTU - Fiber Fault Alarm Distribution (Network)

High Medium Low

Fiber Fault Alarm Distribution	THC005056010112					THC005056010556				
	Wk-41-2011 (2-Oct-2011 To 8-Oct-2011)	Wk-42-2011 (9-Oct-2011 To 15-Oct-2011)	Wk-43-2011 (16-Oct-2011 To 22-Oct-2011)	Wk-44-2011 (23-Oct-2011 To 29-Oct-2011)	Wk-45-2011 (30-Oct-2011 To 2-Nov-2011)	Wk-41-2011 (2-Oct-2011 To 8-Oct-2011)	Wk-42-2011 (9-Oct-2011 To 15-Oct-2011)	Wk-43-2011 (16-Oct-2011 To 22-Oct-2011)	Wk-44-2011 (23-Oct-2011 To 29-Oct-2011)	Wk-45-2011 (30-Oct-2011 To 2-Nov-2011)
High	0	1	0	0	0	0	4	0	0	0
Medium	0	2	6	2	0	0	1	0	0	0
Low	0	0	0	0	0	0	0	0	0	0

Page 1 / 1

Fiber Fault Alarm Distribution

EXFO

Deleting a Dashboard Set

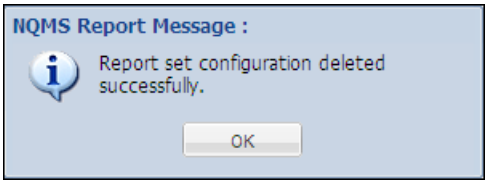
You can delete a dashboard report set.

To delete a dashboard set:

1. From the **Reporting** menu, select **Dashboard** which displays the NQMS Reports page.
2. On the **Dashboard**, under **Options**, click **Report Sets**.

   The **Dashboard Report Set** dialog box is displayed.
3. In the **Report Set's** list, right-click the report set that you want to delete.
4. Click **Delete Report Set**.

   A confirmation message is displayed.

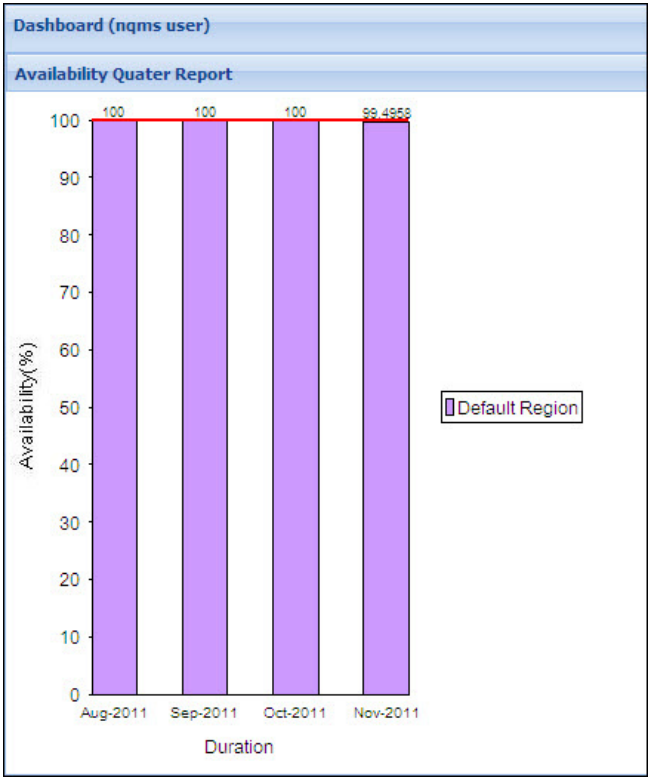


5. Click **OK**.

Chart Drill Down

You can drill down a generated chart from the Region view to an RTU view and from an RTU view to an OR view. To drill down the graph, double-click the region or RTUs for which you want to view the drill down graph.

For example, the following Availability report displays the Region wise bar chart.



To drill down the region data double-click any bar. All the RTUs for the Default Region are displayed in the following graph.

To drill down the data for RTUs, double-click any of the RTUs. All the ORs for the RTUs are displayed in the following graph.

Note: *After you drill down a graph to the OR view, to go back from the OR view to the RTU view and from the RTU view to the Region view, right-click the widget and click* ***Back****. For more information on this option, see Report Dashboard Options* on page 226.

13 Mobile Application

NQMSfiber is now available on smartphone. The new mobile feature is called NQMSfiber- On The Air (NQMSfiber-OTA). This is a browser based Web application, which works on mobile browsers that have GPRS/EDGE/3G internet connectivity for the existing NQMSfiber used for monitoring the data and optical fibers quality.

Note: *By default, this feature is not available in the NQMSfiber application. You must have a valid license for activating this feature. For more information on adding the licence file, see Registering the Application* on page 187.

Some key features of the EMS can be accessed from a smartphone using the Mobile Application and the updates made in the user interface are displayed in the EMS. To access an EMS from a smartphone, the EMS must be on a public domain. A licensed NQMSfiber-OTA communicates with the EMS server on port 8443.

A secured connection to the EMS server provides HTTPS support for mobile application. The secured connection ensures data security as the EMS is on a public domain. The main function of HTTPS is to create a secure channel over an insecure network. HTTPS is not a separate protocol, it refers to use of ordinary HTTP over an encrypted SSL/TLS connection.

Note: *The graphics are best viewed on a smartphone screen size of 2.5 inches (minimum).*

NQMSfiber - OTA has the following features:

- **Alarm Management**
  - Alarm View

    For more information on viewing alarms, see *Viewing Alarms* on page 256.
  - Alarm Detail View

    For more information on managing alarms, see *Managing Alarms* on page 259.

- **Test On Demand (TOD)**

  For more information on test on demand, see *Test On Demand* on page 261.

- **Test on Demand Status**

  For more information on test on demand status, see *Test On Demand Status* on page 268.

- **Resume or Suspend the Routes**

  For more information on route management, see *Route Management* on page 269.

Note: *The mobile application displays the user interface in a localized language depending on the language selected by you in the* ***User Management*** *>* ***User*** *tab. For example, if you select French (fr) in the* ***User Management*** *>* ***User*** *tab, then after logging on to the mobile application interface, the content of the application is displayed in French.*

Logging on to the Mobile Application

Typically the system administrator specifies the user names and passwords for the users when creating them. All the procedures and information presented in this chapter are intended for a user that has administrator rights.

A valid user for Mobile Application can only be created or edited through NQMSfiber GUI, if NQMSfiber is licensed to create mobile users.

To log on to Mobile Application:

Before logging on to the system, ensure that the EXFO technical support has created an Administrator account with the required access rights to create NQMSfiber users.

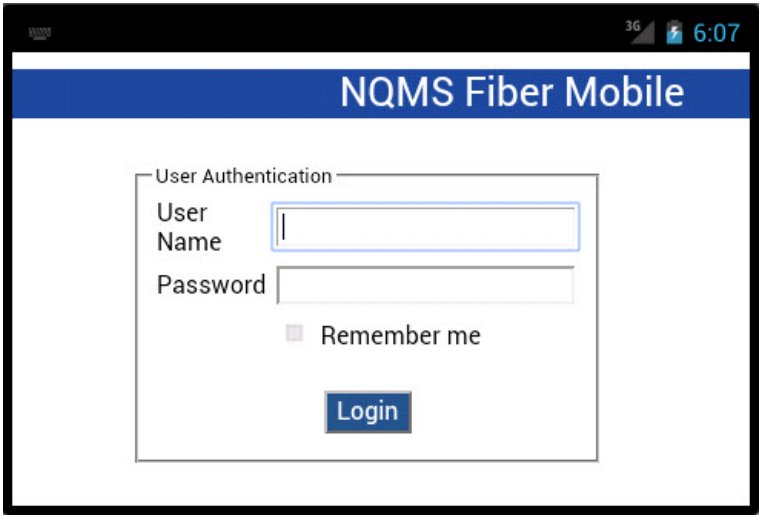
1. Go to the mobile browser and type the https://nqms.mobile.com.

Note: *This link can be opened only if the necessary DNS setup is done.*

OR

You can always access Mobile Application with the https://<IP Address of EMS>:8443/nqmsota link.

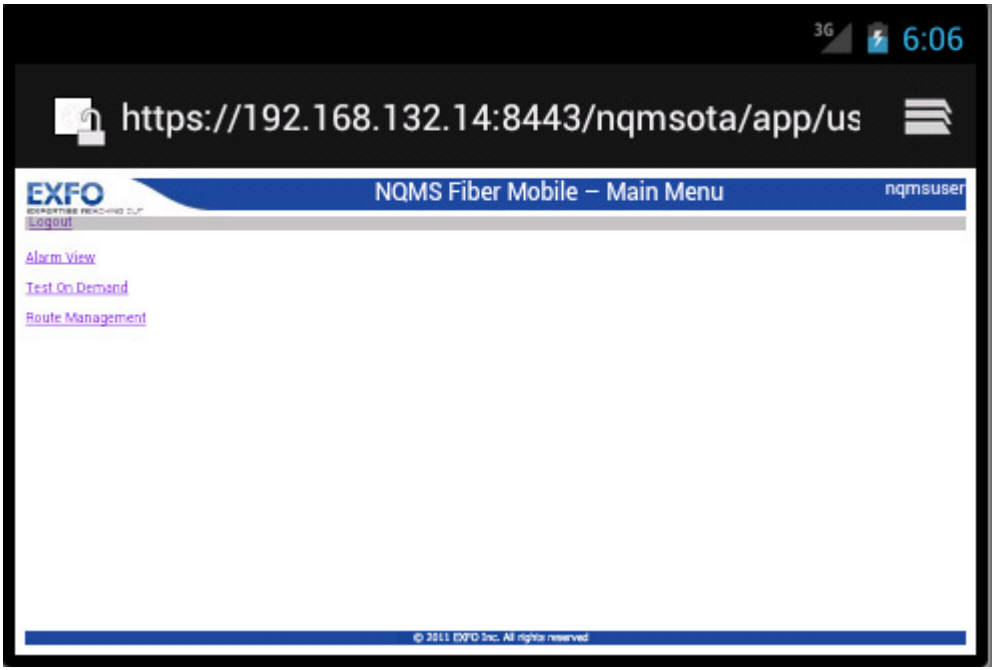
The NQMSfiber-OTA Login page is displayed.



2. Enter your **User Name** and **Password**.

3. Click **Login** or **Reset** to clear all the fields.

   After successful login, the **Main Menu** window is displayed.



Note: *If you enter an incorrect user name or password, the application returns an error message. Enter your user name and password again, and click* ***Login*** *to log on to the application.*

Changing the Password

If you enter incorrect user name or password three consecutive times, your account is locked and the following message is displayed: **Your account has been locked. Please contact system administrator**.

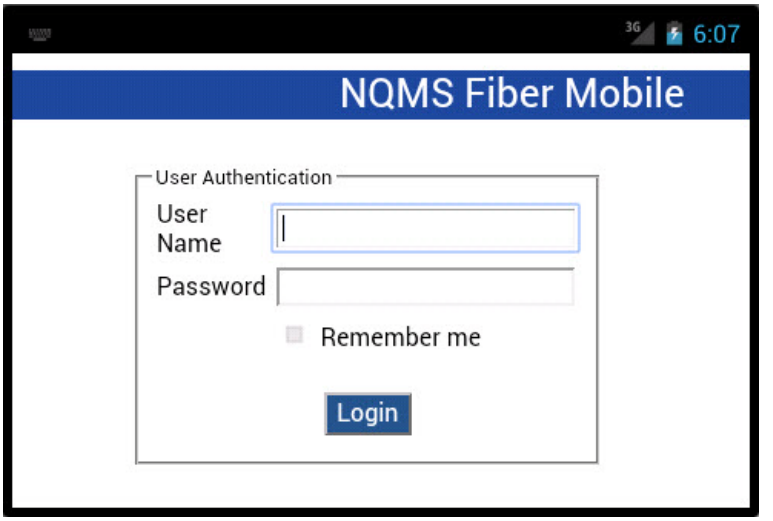
The password can be reset by the EMS Administrator using the EMS GUI and then user can log on to the mobile application with the new or updated password.

To change the password:

Before logging on to the system, ensure that the EXFO technical support has created an Administrator account with the proper access rights to create NQMSfiber users. Log on to mobile application with the temporary password assigned by the administrator.

1. Go to the mobile browser and type the https://nqms.mobile.com.

   The NQMSfiber-OTA Login page is displayed.

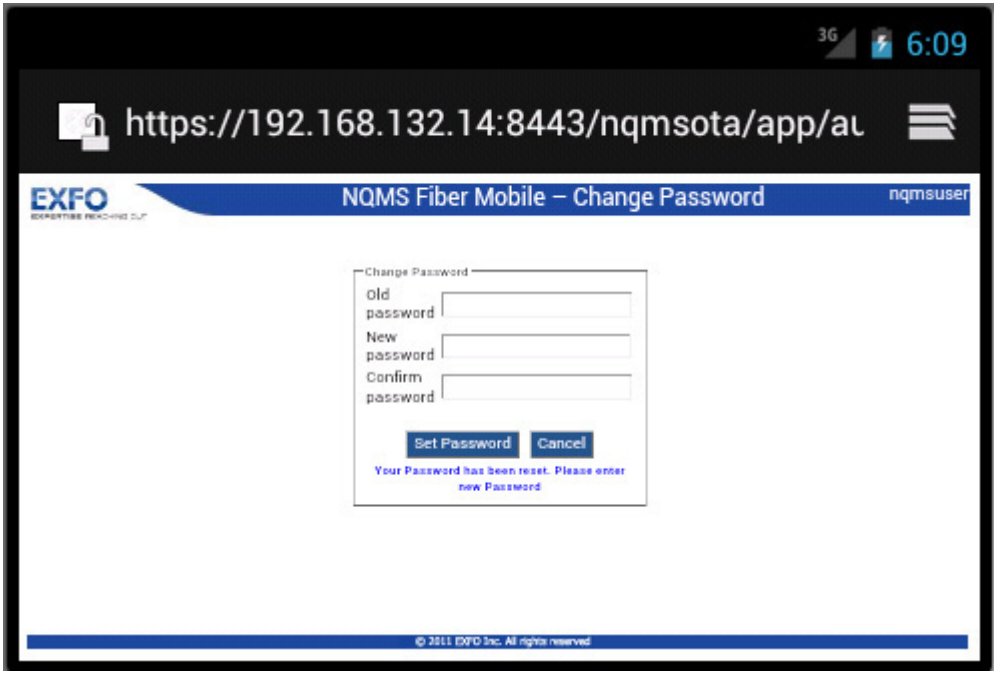


2. Enter your valid **User Name** and **Password**.

Note: *The password that you enter is the temporary password assigned by the EMS administrator.*

3. Click **Login**.

The **Change Password** window is displayed.



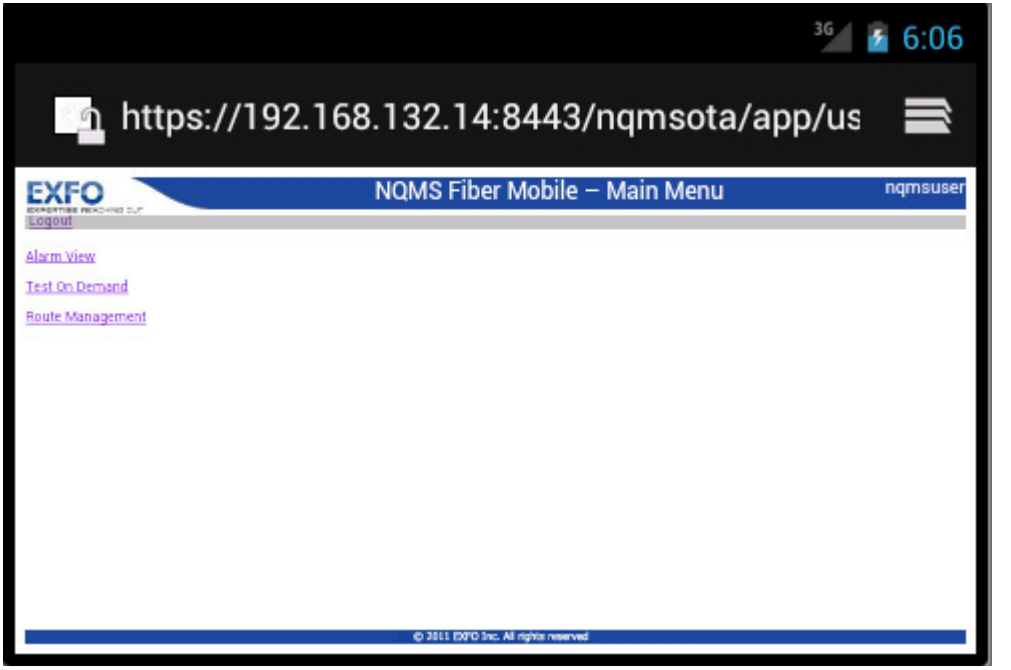
4. Enter the **Old password** and **New password**.

5. Enter the new password in the **Confirm password** box.

Note: *The length of the new password should be more than three characters and less than eight characters. You cannot enter blank spaces.*

6. Click **Set Password**.

   The Main Menu window is displayed.



Logging Out of the Mobile Application

To log out of the mobile application:

Click **Logout**.

You return to the NQMSfiber-OTA Login window.

Viewing Alarms

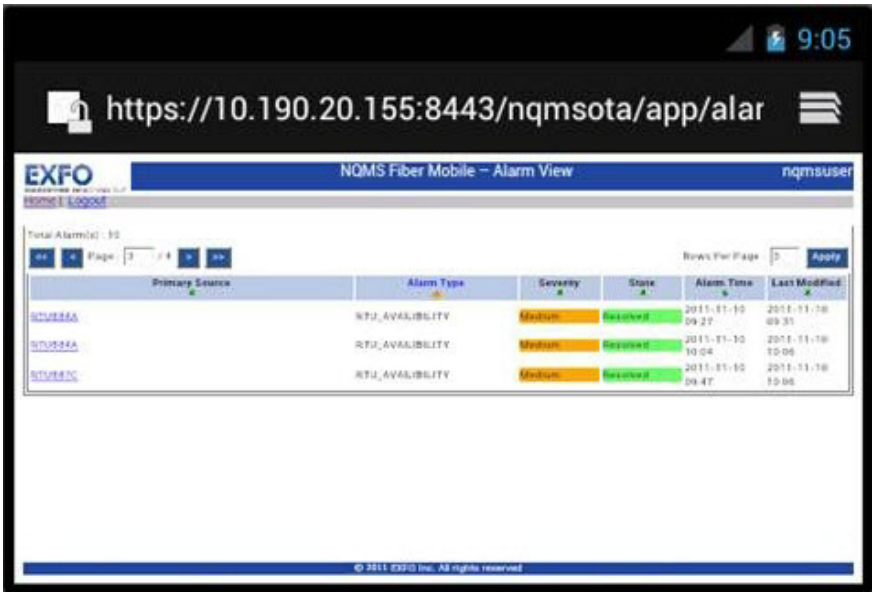
You can view the list of alarms from the EMS. One row represents one alarm. By default, 10 alarms are displayed per page with details such as alarm type, severity, state, alarm time, and last modified date. You can sort alarms based on the Alarm Type in which fiber fault alarms type are displayed first followed by other types of alarms.

After the **Alarm View** window is displayed, updates to the alarms are not updated automatically. To view the latest changes made by another smartphone user or a user from EMS GUI, you must reopen the **Alarm View** window.

To view alarms:

On the **Main Menu** window, click **Alarm View**.

The **Alarm View** window is displayed.



The alarm navigation panel displays the following fields:

Components	Description
Total Alarm(s)	Displays the total number of alarms updated when new alarms are generated or existing alarms are deleted. The new or updated alarms are added to the total alarm count. This is a non-editable field.
Page	To view a page, enter the page number in the **Page** field and press **Enter**. You can view the page number of the alarms that is currently displayed (X) and the total number of pages with alarms (Y). For example, Page X/Y. If you enter a page number less than or greater than existing number of alarm pages, an error message is displayed. You can only enter positive integer values.
	To view the first alarm page, click the icon. This button is disabled for the first page of the alarm details. By default, the first page of alarm details is displayed when you log on.
	To view the previous alarm page, click the icon. This button is disabled for the first page of the alarm details and when all alarms are displayed one page.
	To view the next alarm page, click the icon. This button is disabled for the last page of the alarm details and when all alarms are displayed one page.
	To view the last page, click the icon. This button is disabled for the last page of the alarm details.
Rows Per Page	Displays the number of rows to be displayed per page. You can set the number of rows to be displayed per page (10 by default).

For each alarm, the following information is displayed:

Components	Description
Primary Source	Displays the optical route name. Click the optical route for which you wan to view and manage the alarm details. For more information on alarm details, see *Managing Alarms* on page 259.
Alarm Type	Displays the type of alarms.
Severity	Displays the severity of alarms as **Low**, **Medium**, or **High**.
State	Displays the state of the alarms as **Pending**, **Acknowledged**, **In Progress**, **Ignored**, or **Resolved**.
Alarm Time	Displays the date and time when the alarm was generated. The date appears in a YYYY-MM-DD HH:MM format.
Last Modified	Displays the last modified date of the alarms. The date appears in a YYYY-MM-DD HH:MM format.

Note: To sort the alarms by a column head, click the green arrow corresponding to the column by which you want to sort the alarms. The column arrow by which the alarms are sorted appears in yellow. To sort the alarms in ascending or descending order, click the or arrows.

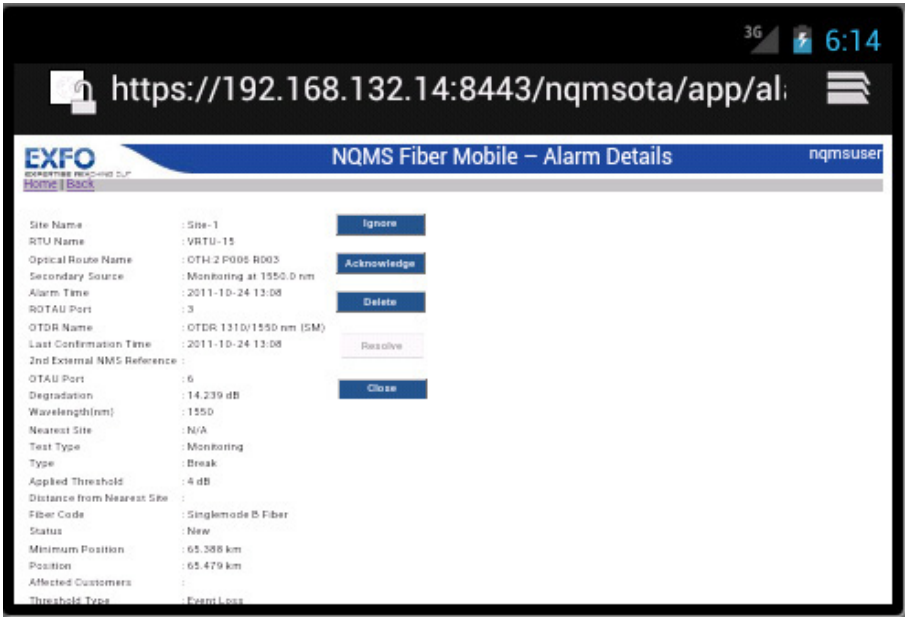
Managing Alarms

You can view the full details of each alarm and change their statuses. You can also delete alarms. If an alarm is in any one of the following states: In Progress, Ignored, or Resolved, you can only delete the selected alarm. All the other buttons such as Ignore, Acknowledge, and Resolve are disabled on the Alarm Details window. If an alarm is in Pending state, you can Ignore, Acknowledge, or Delete the selected alarm. The Resolve button is disabled on the Alarm Details window. Values of attributes are displayed with appropriate units and up to three decimal places.

To manage alarms:

1. On the **Alarm View** window, click the optical route name of the alarm for which you want to view the alarm details.

   The **Alarm Details** window is displayed with the details of the selected alarm.



The following buttons are active based on the current state of an alarm life cycle. For example, the **Resolve** button remains disabled if an alarm is not acknowledged:

- Click **Ignore** to change the status of an alarm to ignored.
- Click **Acknowledge** to change the status of an alarm to acknowledged. After an alarm is acknowledged, you can only delete or resolve the selected alarm. The **Acknowledge** and **Ignore** buttons are disabled on the Alarm Details window.
- Click **Delete** to delete an alarm. The alarm is no longer displayed in the list of alarms. You can delete an alarm if it is in the **Pending**, **Acknowledge**, **In Progress**, or **Ignored** statuses.
- Click **Resolve** to change the status of an alarm to resolved.

2. Click **Close** to return to the **Alarm View** window.

For more information on alarms, see *Receiving and Processing Alarms* on page 101.

Test On Demand

The Test On Demand feature is used to test an optical route. Test on demand refers to the immediate execution of a test setup on the RTU. You can initiate a test on demand as and when required. You can view all the tests on demand performed on a particular RTU by all of the users.

You can also view the user's related regions, all the RTUs corresponding to the selected region, all the Optical Routes (OR) related to the selected RTU. Test on Demand displays test setups of each OR, details of the selected test setup (values of attributes are displayed with units and up to three decimal places), and Test On Demand status for each OR.

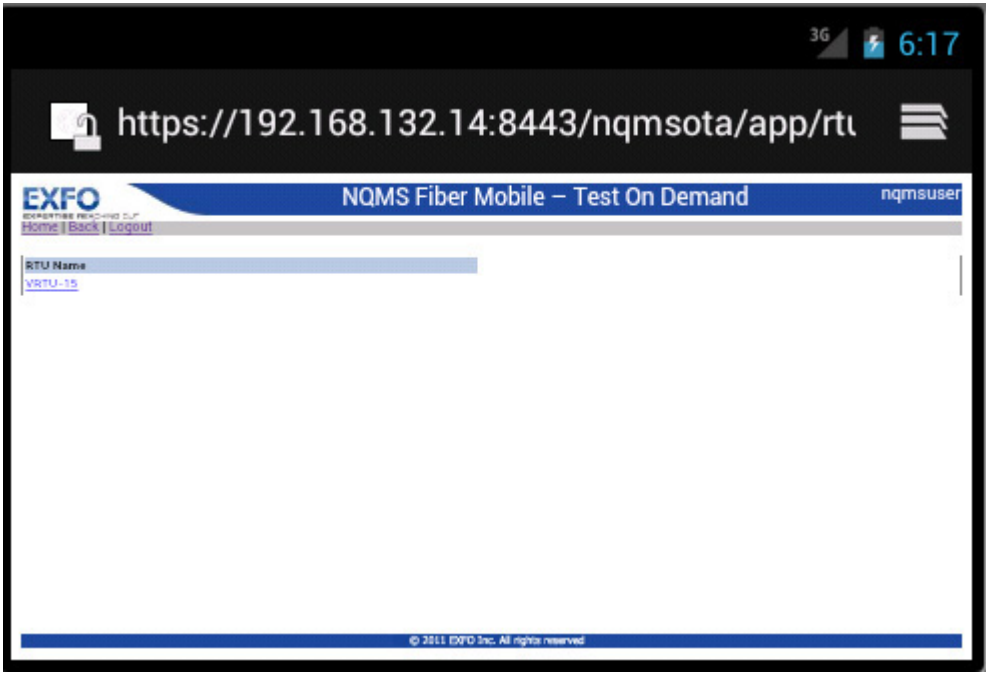
To test an optical route:

1. On the **Main Menu** window, click **Test On Demand**.

   The regions are displayed based on regions assigned to you in the **User Management** tab.

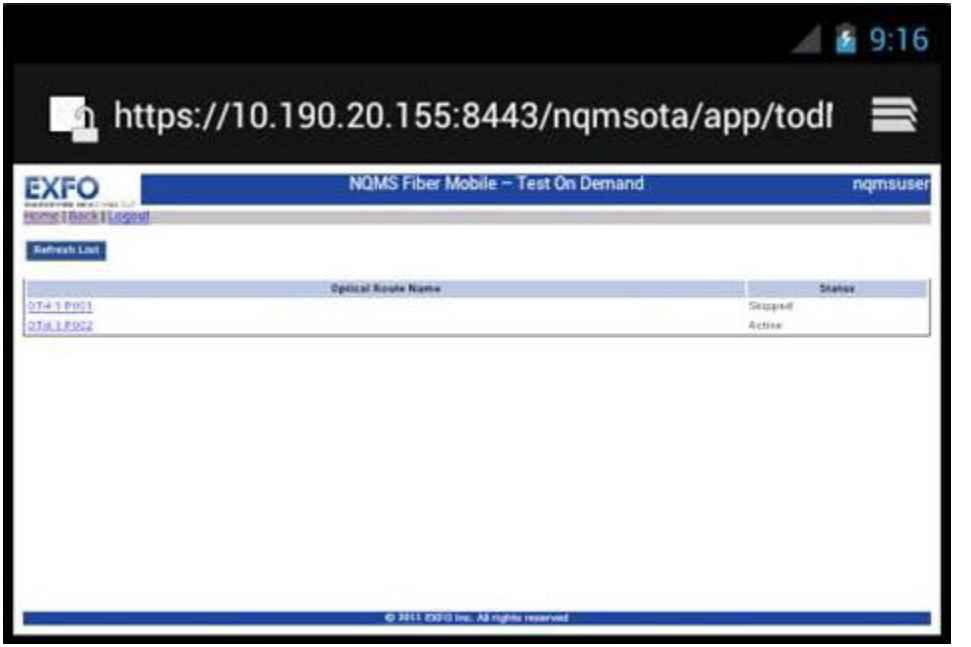
2. Select the region to which the optical route belongs.

   The RTUs related to that region are displayed.



3. Select an RTU to view its corresponding Optical Routes (OR).

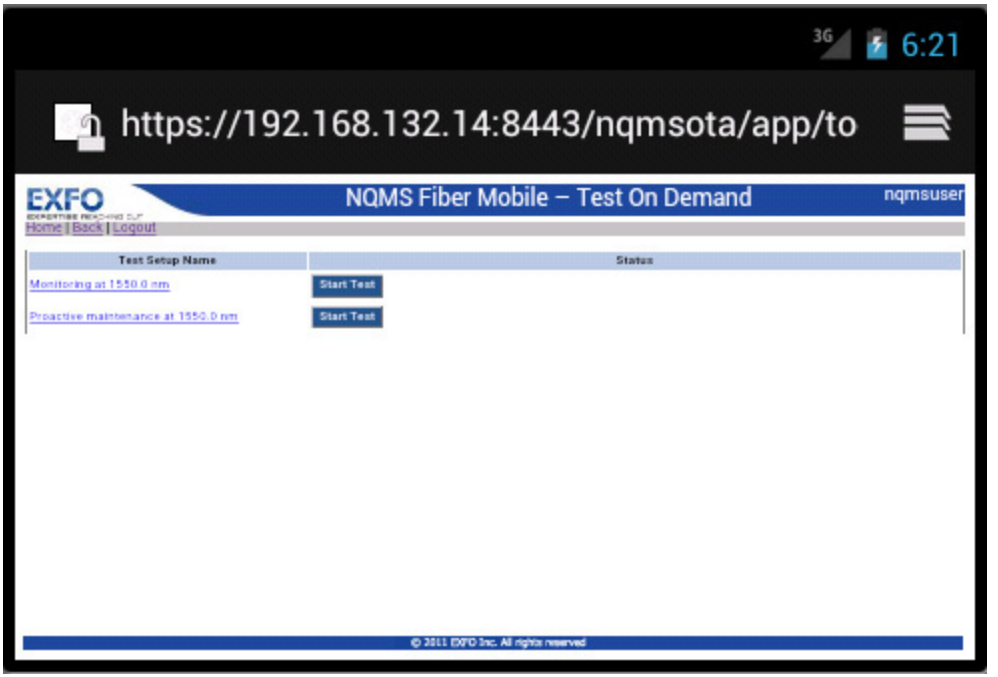
   The ORs related to the selected RTU are displayed with the status as **Active** or **Skipped**.



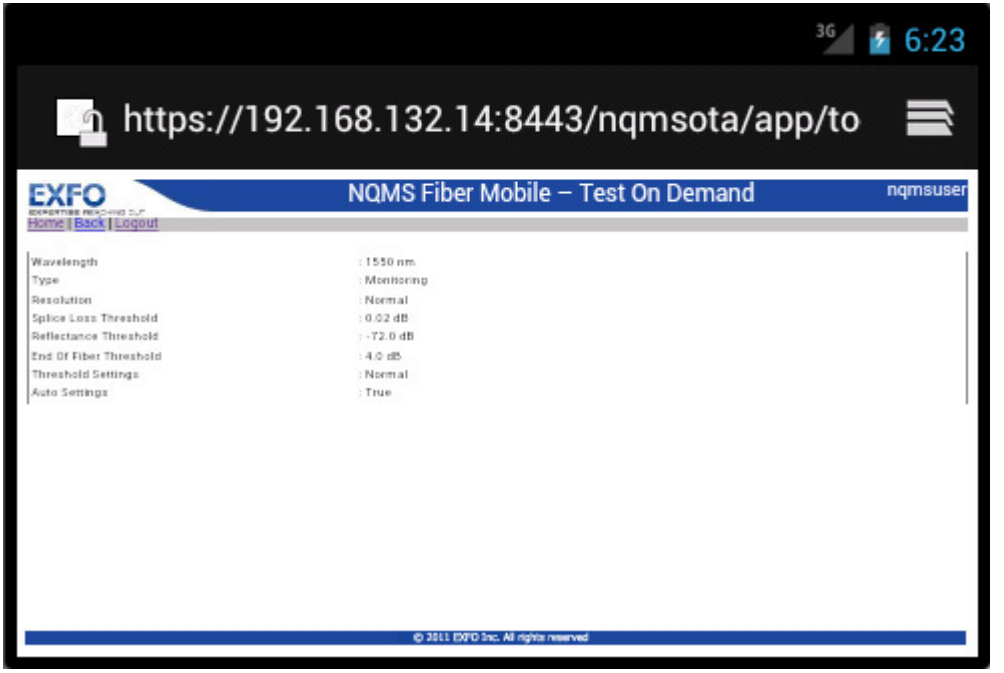
Note: *To refresh the OR list, click* ***Refresh List****.*

4. Click the Optical Route to view the tests that can be performed for that route.

   The **Test Setup Name** column displays the tests configured in the EMS for the Optical Route.

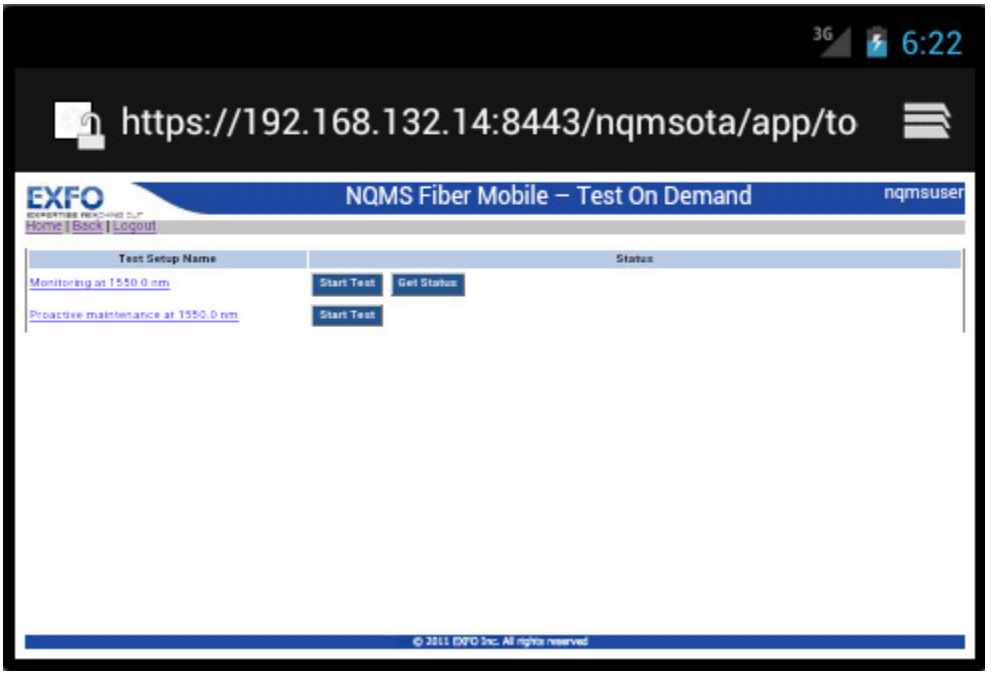


5. To view the details of a test, click the **Test Setup Name**.



OR

To perform a test, click **Start Test** corresponding to the OR for which you want to run the test.



Note: *Click **Back** to go to the previous page.*

Test On Demand Status

You can view the status of the test that you run on the OR.

To view the test on demand status:

On the **Test On Demand** window, click **Get Status**. The result displayed is **Fiber is OK** or **Fiber is Faulty**.

Note: *The time taken for the result to be displayed is based on the time taken to perform the test on an OR. It takes approximately 15-20 seconds for a test to complete.*

Note: *To configure or modify test settings, see Defining System Setting Parameters* on page 31.

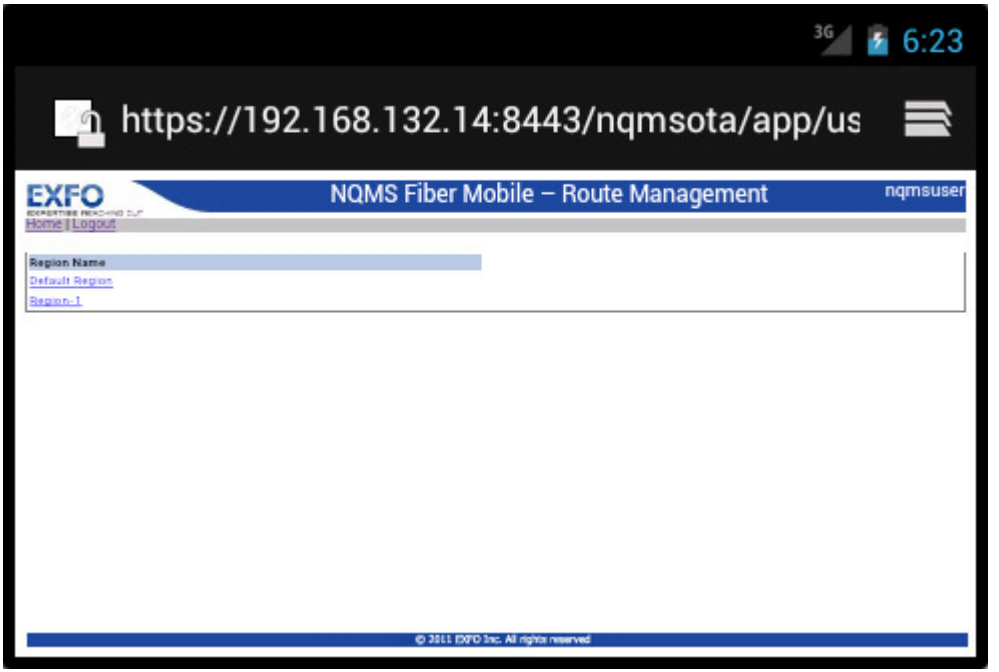
Route Management

Route Management is used to suspend or resume testing of an optical route. You can click the OR name to view the Test Setups for an optical route. If the selected OR is in Active status, you can suspend the OR and if the selected OR is in Skipped status, you can resume the OR.

To suspend or resume testing of an optical route:

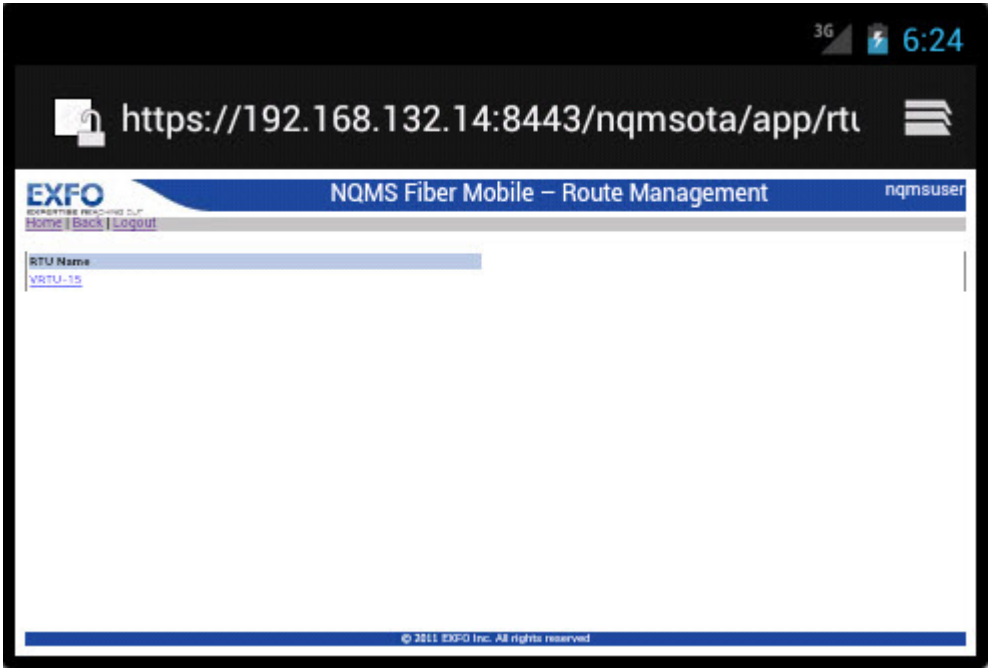
1. On the **Main Menu** window, click **Route Management**.

   The regions are displayed based on regions assigned to you in the **User Management** tab.



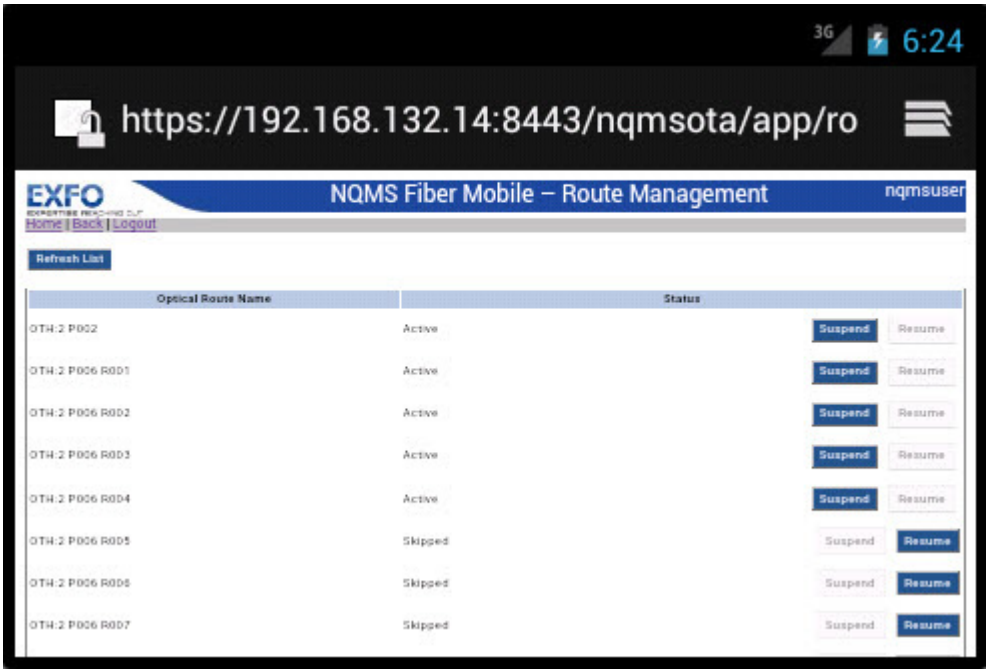
2. Select the region to which the optical route belongs.

   The RTUs related to that region are displayed.



3. Select an RTU to view its corresponding ORs.

   The OR list displays all the ORs related to the selected RTU.



4. To suspend testing of an optical route in the **Active** status, click **Suspend**.

   OR

   To resume testing of an optical route in the **Skip** status, click **Resume**.

Note: *To update the list of optical routes of an RTU, click **Refresh List**.*

14 Working with a Workstation Agent

An NQMSfiber workstation agent alert you when an alarm occurs or when an alarm condition changes in the system. The workstation agent is installed locally on the your computer and provides information about newly generated alarms on the desktop.

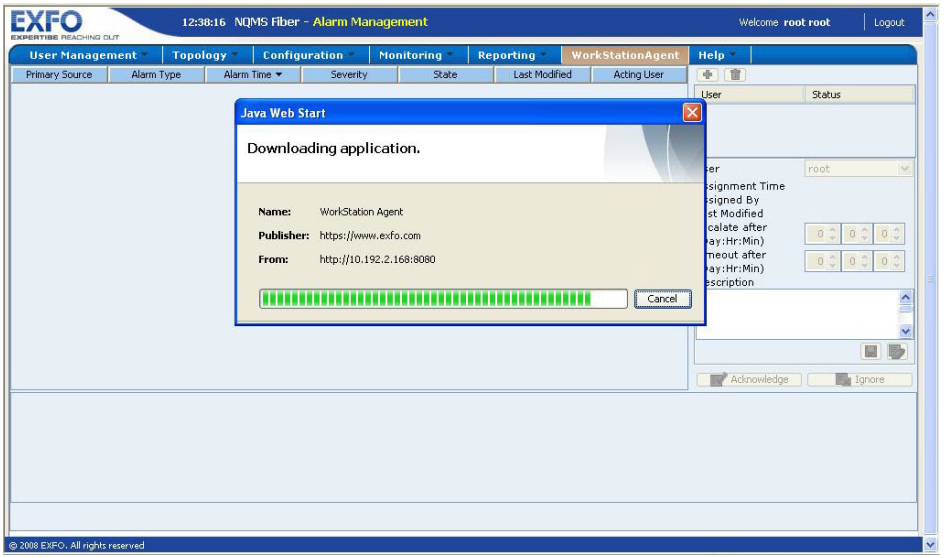
Installing the Workstation Agent

Installing the workstation agent is a one-time process. Once it is installed, it automatically checks for updates and installs them.

To install the workstation agent:

1. Click **Workstation Agent** on the menu.

   A new windows opens and the workstation agent starts downloading on your computer.



After performing a one-time installation, the workstation agent will start automatically and appear in the system tray of the desktop. When you restart the computer, the workstation agent appears automatically in the system tray, and you enter the login ID and password to authenticate on the server.

Note: *Only regular users of the system who have the permission to view alarms get authenticated and will start receiving alarm notifications.*

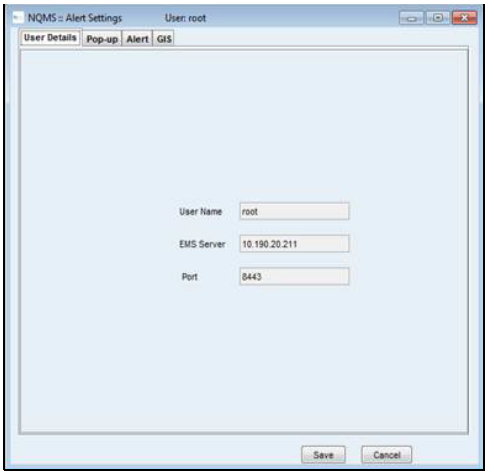
Configuring the Workstation Agent

The workstation agent can be configured to display a pop-up message on the system whenever a new alarm is generated. The pop-up is accompanied by a sound that alerts you about this new alarm. The pop-up is similar to a new e-mail message. You can configure user details, pop-up messages, alerts and GIS settings for the Workstation agent.

To configure the user details:

1. Right-click the icon in the system tray.
2. Click **Settings**. The **NQMS Alert Settings** box is displayed.
3. Select the **User Details** tab.

   By default, the **User Details** tabs displays the **User Name**, the **EMS Server** information (from where the workstation agent is installed) and the **Port** information (the network on which the workstation agent is running).

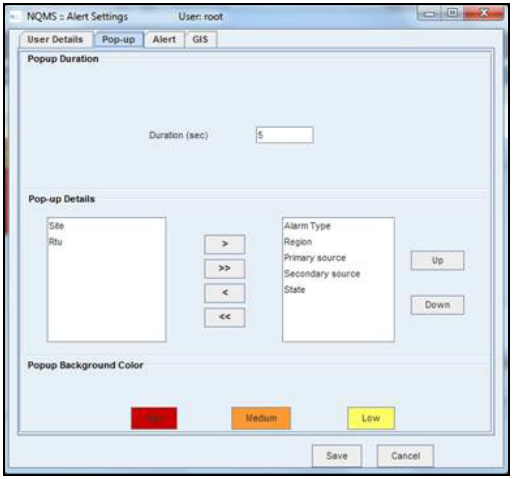


4. Press **Save** to save the **User Details** configuration or **Cancel** to discard it.

To configure the pop-up notification details:

1. Right-click the icon in the system tray.
2. Click **Settings**.

   The **NQMS Alert Settings** box is displayed.
3. Select the **Pop-up** tab.
4. Enter the **Popup Duration** (alarm notification duration) in seconds.



5. From the **Pop-up Details** pane, select the required alarm parameters from the left box to the right. The available pop-up parameters are:
   - **RTU** displays *RTU Name* for alarm notification.
   - **Site** displays *RTU Associated Site Name* in alarm notification.
   - **Alarm Type** displays *Fault Type* for alarm notification.
   - **Region** displays *Site Associated Region Name* for alarm notification.
   - **Primary source** displays *Primary Source* for alarm notification.

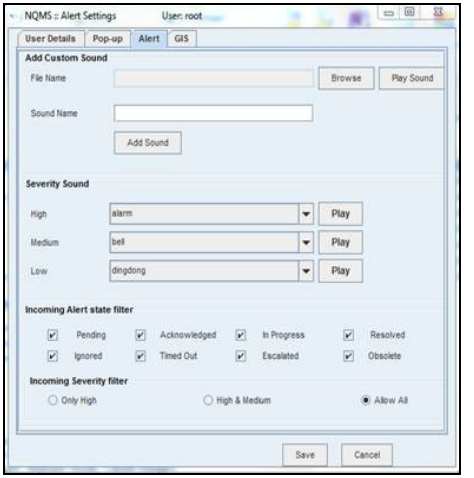
- **Secondary source** displays *Secondary Source* for alarm notification.
- **State** displays *State* for alarm notification.

6. Press **Up** or **Down** to change the ordering which the selected alarm parameters will appear in the pop-up.
7. Configure the **Popup Back Ground Color** for the notification for different levels of alarm severities. By default, three colors are configured for the three alarm severities as listed below.
   - Red is for **High**.
   - Orange is for **Medium**.
   - Yellow is for **Low**.
8. Press **Save** to save the **Pop-up** configuration or **Cancel** to discard it.

To configure the alert details:

1. Right-click the icon in the system tray.
2. Click **Settings**. The **NQMS Alert Settings** box is displayed.
3. Select the **Alert** tab.

Note: *To create a customized sound, in the **Add Custom Sound** section, click **Browse,** select the desired sound, and click **Add Sound**. The customized will automatically appear in **Severity Sound** section.*



4. In the **Severity Sound** section, select the sound that you want to set as the **High**, **Medium** and **Low** severity sounds for the alert notification. By default, a sound is selected each severity.

Note: *Using a different sound for each severity level helps you to quickly differentiate them.*

5. Select the desired **Incoming Alert state filter** option to configure the alarm state for which the notification should be sent.
6. Select the desired **Incoming Severity filter** option to configure the alarm severity for which the notifications should be sent.

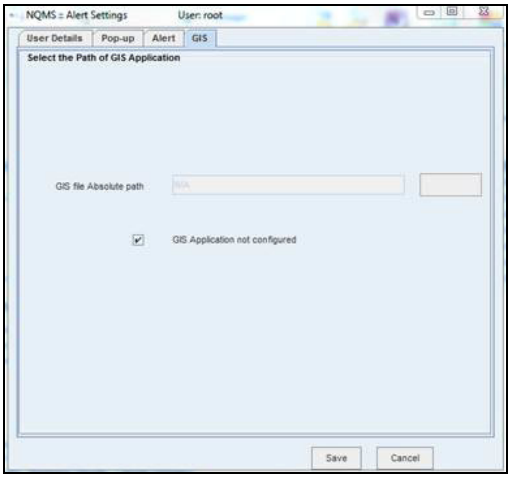
Note: *You can select any combination between the Incoming Alert state filter and Incoming Severity filter.*

7. Press **Save** to save the **Alert** configuration or **Cancel** to discard it.

To configure OSP:

1. Right click the icon in the system tray.
2. Click **Settings**. The **NQMS Alert Settings** box is displayed.
3. Select the **OSP** tab.
4. Click **Browse** to select the OSP application path and select only the .exe file for configuration.

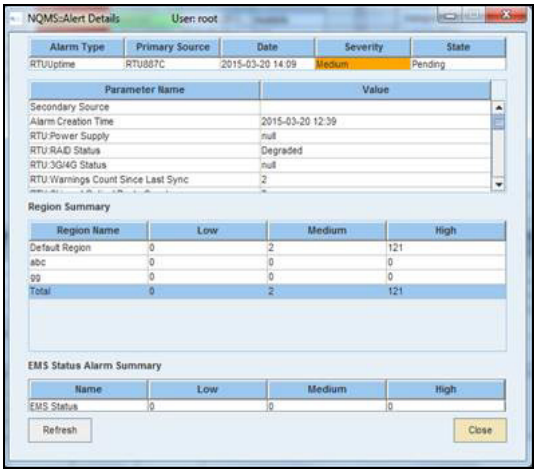
Note: *If OSP application is not installed on system where workstation agent is running then please select check box OSP Application not configured.*



5. Press **Save** to save the **OSP** configuration or **Cancel** to discard it.

Workstation agent will apply the user settings and display the alarm notification pop-up based on the above settings as displayed below.

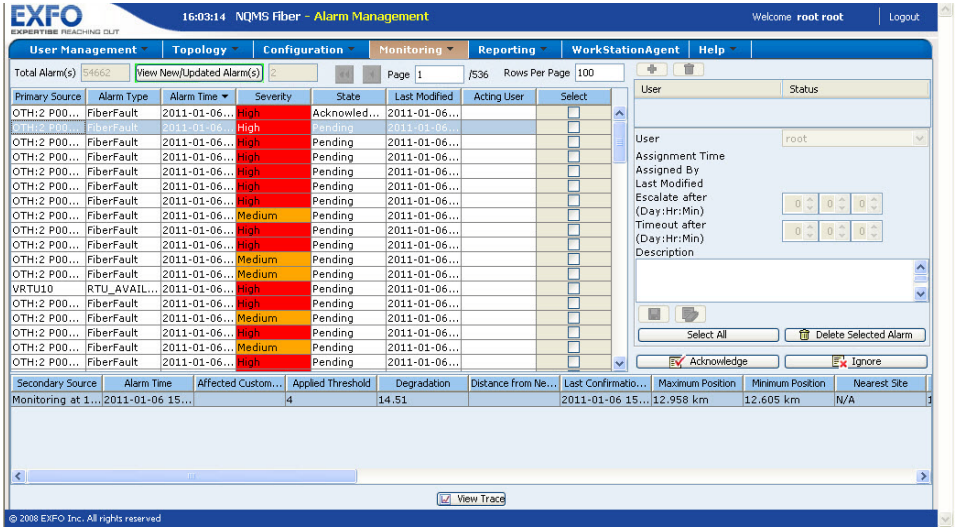
The workstation agent's color also changes to indicate a new alert. You can right-click the tray icon to view menu and select **Detail**, or double-click the tray icon to open an alarm summary window.



This window displays the following details:

- Total alarm count per severity (based on users region of responsibilities; does not take into account users alert setting). This corresponds to the total of all alarms in the system for a specific severity.
- **Region Summary**: alarm count per severity for each region of responsibilities.
- **EMS Status Alarm Summary**: details of the latest alarm generated, based on users alert setting.

You can also click the Open Alarm Management Window button to display the **NQMS**: **Alarm Management** window.



Note: *For more information about alarm management, see* Receiving and Processing Alarms *on page 101.*

You can also stop the workstation agent by right-clicking the tray icon to show the menu, and selecting the **Quit** menu item. This will exit the agent application.

15 Maintenance

To help ensure long, trouble-free operation:

- Always inspect fiber-optic connectors before using them and clean them if necessary.
- Keep the unit free of dust.
- Clean the unit casing and front panel with a cloth slightly dampened with water.
- Store unit at room temperature in a clean and dry area. Keep the unit out of direct sunlight.
- Avoid high humidity or significant temperature fluctuations.
- Avoid unnecessary shocks and vibrations.
- If any liquids are spilled on or into the unit, turn off the power immediately, disconnect from any external power source, remove the batteries and let the unit dry completely.

WARNING

The use of controls, adjustments and procedures, namely for operation and maintenance, other than those specified herein may result in hazardous radiation exposure or impair the protection provided by this unit.

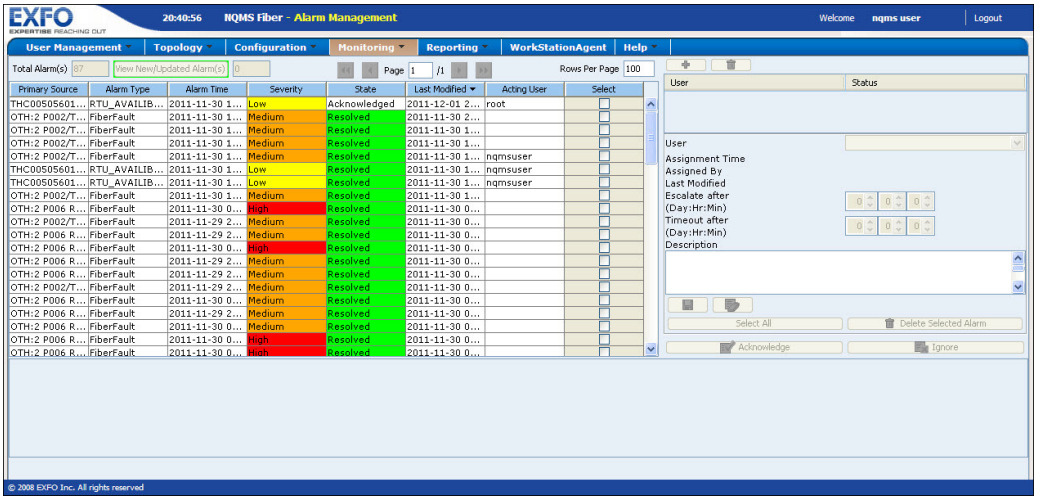
This chapter also provides information about the NQMSfiber system maintenance window as well as maintaining the RTU with the latest software versions.

System Maintenance

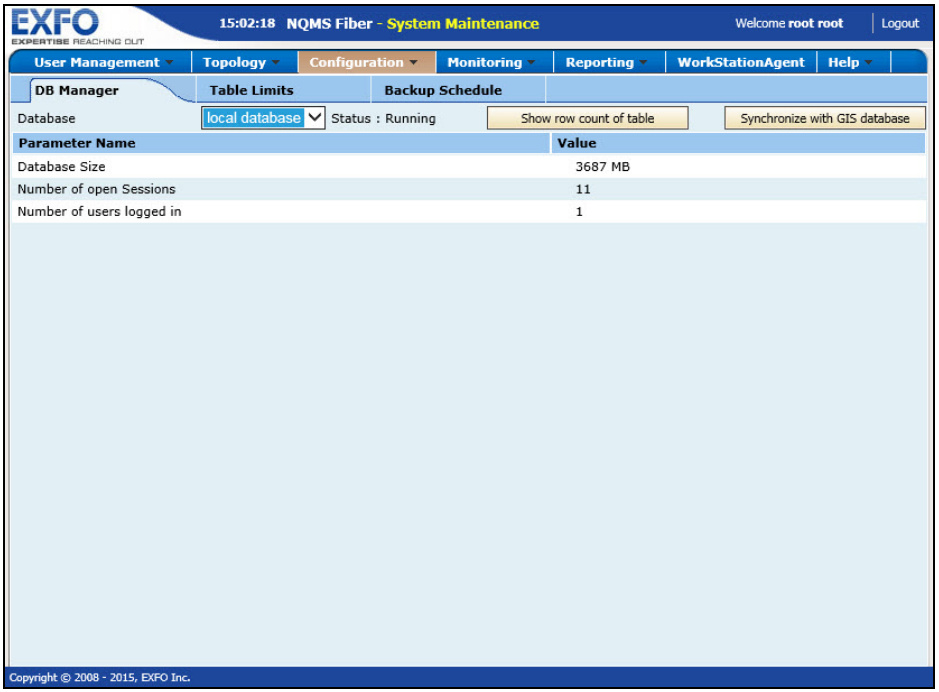
NQMSfiber system maintenance windows displays information about the system database in a filtered format. The results are in a read only format and cannot be edited.

To view the system maintenance status:

1. From the **Configuration** menu, select **System Maintenance**.



2. Select the database name from the **Database** drop-down list.



The system maintenance window is displayed providing information about various database parameters:

- **Database Size**
- **Number of open sessions**
- **Number of users logged in**

3. Click **Show row count of table** to view additional information.

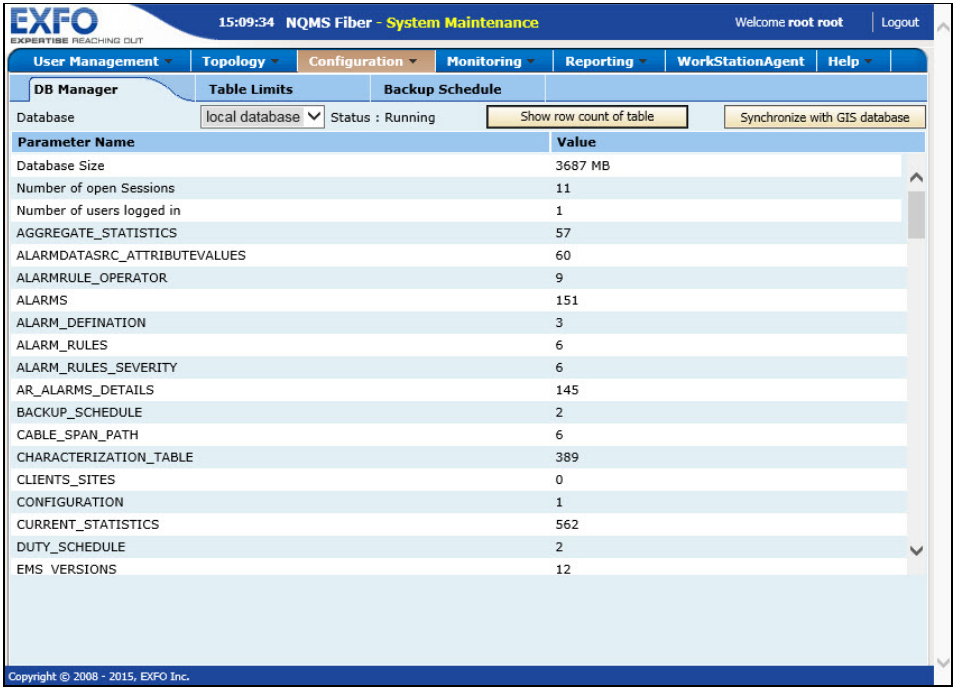
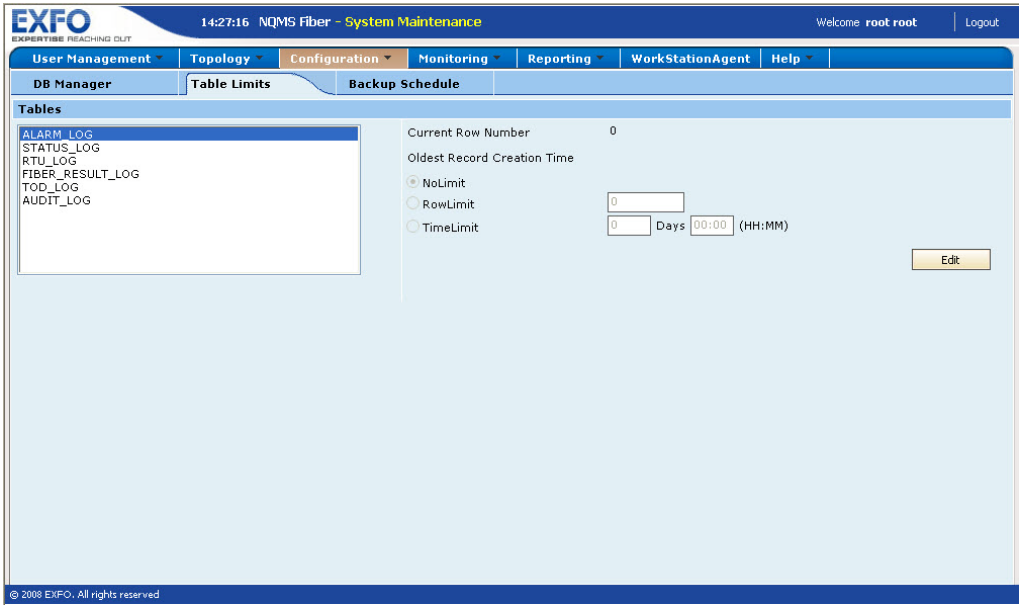


Table Limits

Table limits is used for maintaining the database tables. By default, trigger is set for every 12 hours. Table limits under maintenance allows you to configure log table limits for alarms and status conditions. Logs tables can be configured to display logs for a particular number of rows or for a specific period.

To configure table limits:

1. From the **Configuration** menu, select **System Maintenance**.
2. Click the **Table Limits** tab.



3. Click **Edit**.

4. Fill out the required information:

- Tables: select **the required log table**.The limit for each log table is listed below.
- **Current row number**: It represents the current count of rows present in database for that particular table.
- **Oldest record creation**: It represents the time and date at which the record was updated in table.

  Select any of the option below according to your preferences to specify the limits for the log tables:

  NoLimit: Selecting this option won't have any affect on row limits when trigger is fired. It will keep on increasing the rows limit till the disk is full.

  RowLimit: select this option to retrieve the log information for the specified number of rows for the log table.

  For example, Row limit is set to 1000, and trigger is set for every 12 hour, say at 12.00 am we have set the trigger, then trigger will be fired at 12.00 PM exactly after 12 hour. At 12.00 PM, system will keep only 1000 latest entries in database and all other will get deleted. That means at 12.00 PM, there should be only 1000 entries in database for that time only, but after 12.00 PM again the count will increase and it will repeat the same process.

TimeLimit: select this option to retrieve the log information for the specified number of days/time. For example, if you want to view the logs only for the past seven days, you can specify the number 7 in the days text box.

Recommendation: The limit for each log table is listed below.

ALARM_LOG - 365 days.

STATUS_LOG - 2 days.

RTU_LOG - 2 days.

FIBER_RESULT_LOG - 365 days.

TOD_LOG - 2 days.

AUDIT_LOG - 2 days.

5. Click **Save** to apply your changes or click **Cancel** to discard them.

Note: *Table Limits depend upon the free disk space available on the server. Limits are ignored if there is no free space available. You can view the details about disk space using the EMS status tab.*

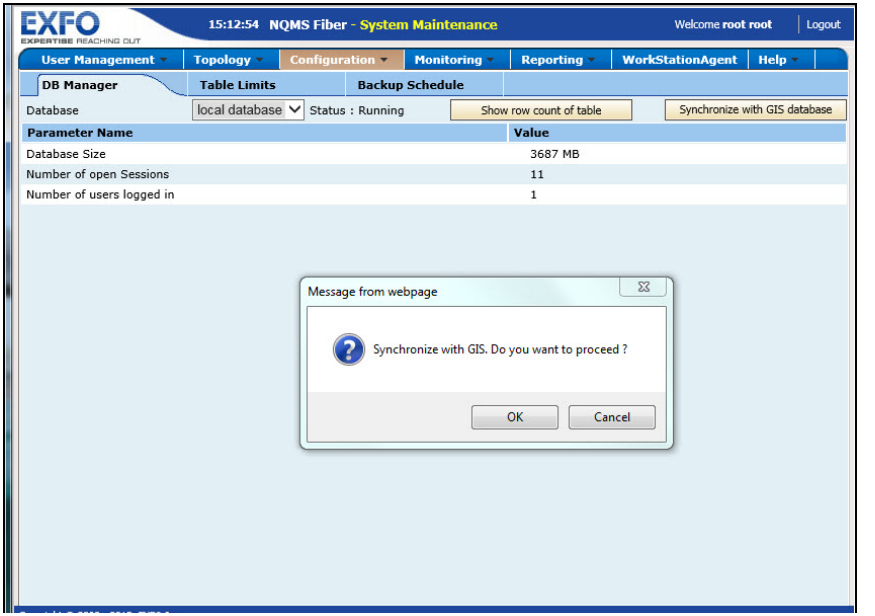
GIS Features Integration

Geographic Information System (GIS) is a tool based methodology to collect, store and analyze data. GIS features integration is a process where the NQMSfiber system synchronizes data with the EXFO GIS system known as **OSPInsight**.

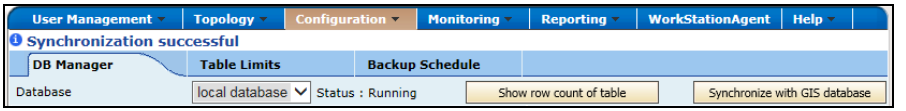
During the synchronization process, all optical routes and site related data is fetched from the **OSPInsight** database and updated to the local database. GIS system also receives email about alarms in the form of XML attachment from the EMS system.

To synchronize with GIS:

1. From the **Configuration** menu, select **System Maintenance**.
2. Click **Synchronize with GIS database.** A confirmation message box is displayed.



3. Click **OK** to start synchronization with **OSPInsight** or the integrated GIS solution.The Synchronization successful message is displayed at the top left side of the screen.

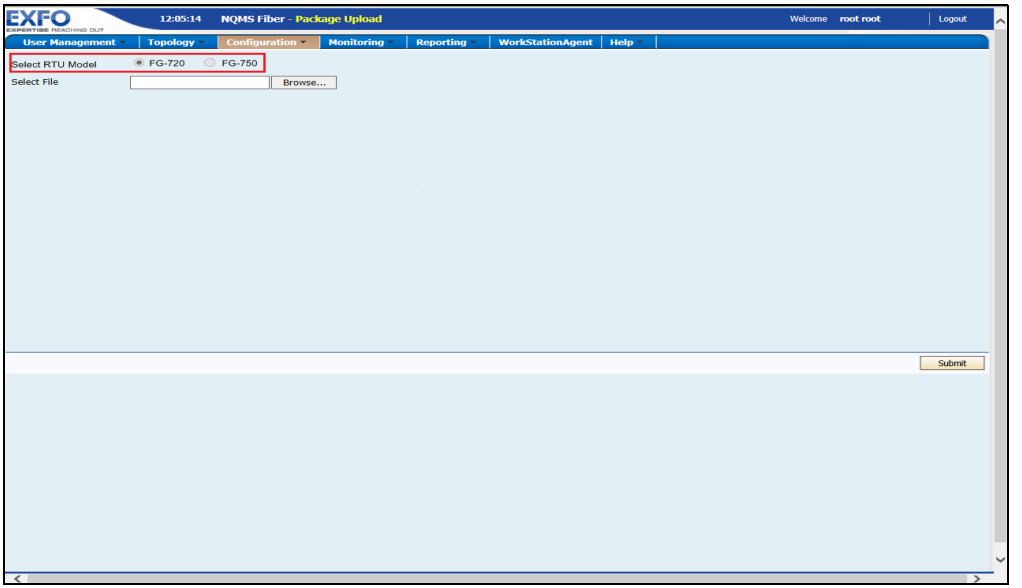


Upgrading Software with Software Packages

The NQMSfiber system tracks the current version of all accessible RTUs and maintains only one software upgrade at a given time. The RTU provides the required status updates for this process. You can upgrade the RTU software by scheduling software download and upgrades.

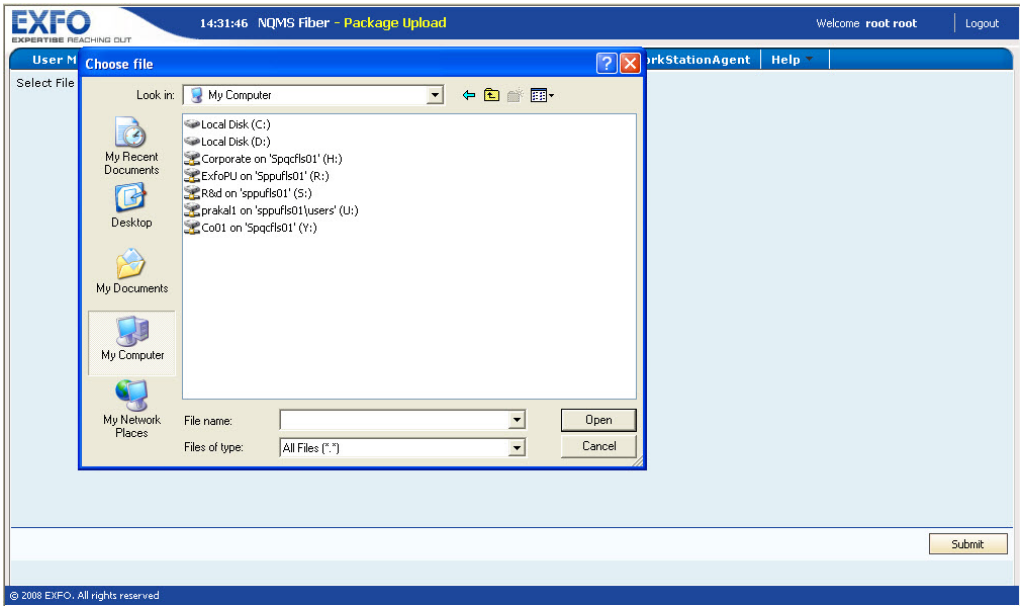
To upload a file for software distribution:

1. From the **Configuration** menu, select **Software Packages** > **Package Upload**.
2. Select which RTU model you want to upgrade.



3. Click the **Browse** button.

   The **Choose file** dialog box is displayed.



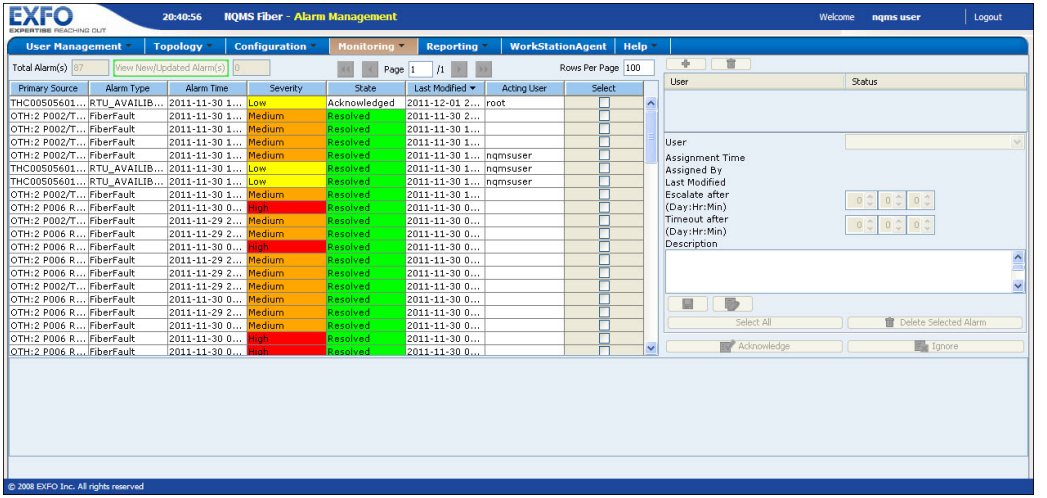
4. Select the file from the location on the disk. The file can be any file which assists in the process of RTU software upgrade.

5. Click **Open**.

6. Click **Submit**. The selected file is uploaded and displayed as a package in **Upgrade Schedule** under **Software Packages**.

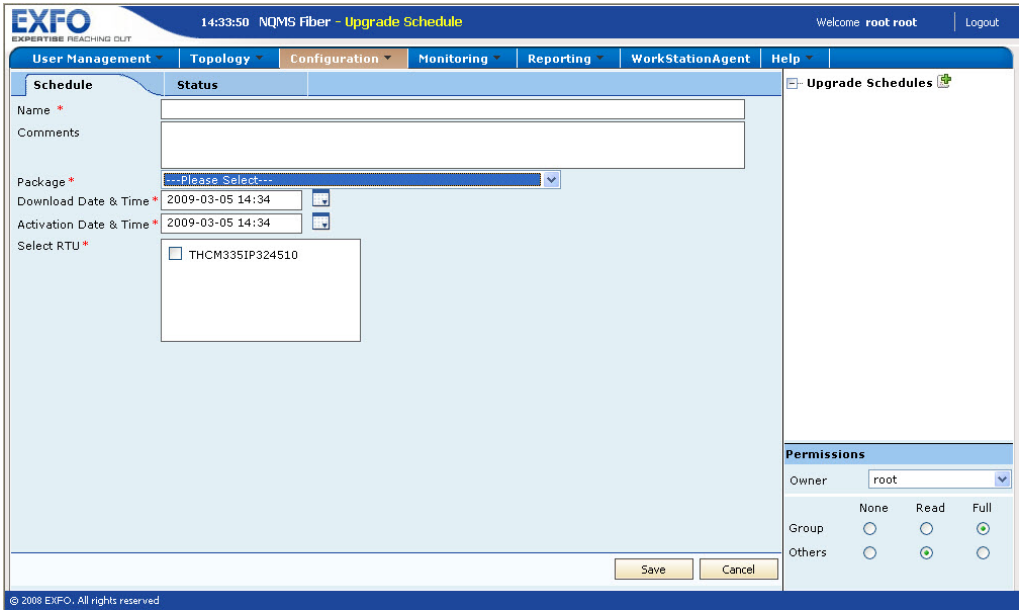
To configure a software upgrade:

1. From the **Configuration** menu, select **Software Packages**.



2. Click **Upgrade Schedule**.

3. From the **Upgrade Schedule** list, click .



4. Fill out the required information:

   - **Name**
   - **Comments**
   - **Package**: select the required package from the drop-down list. The model name appears in parentheses. Only RTU models targeted by the selected package will appear in the list.
   - **Download Date & Time**: click to select the date and time for scheduling the software downloads.
   - **Activation Date & Time**: click to select the date and time for scheduling the software activation.
   - **Select RTU**: select the RTU for which the upgrade is to be scheduled.

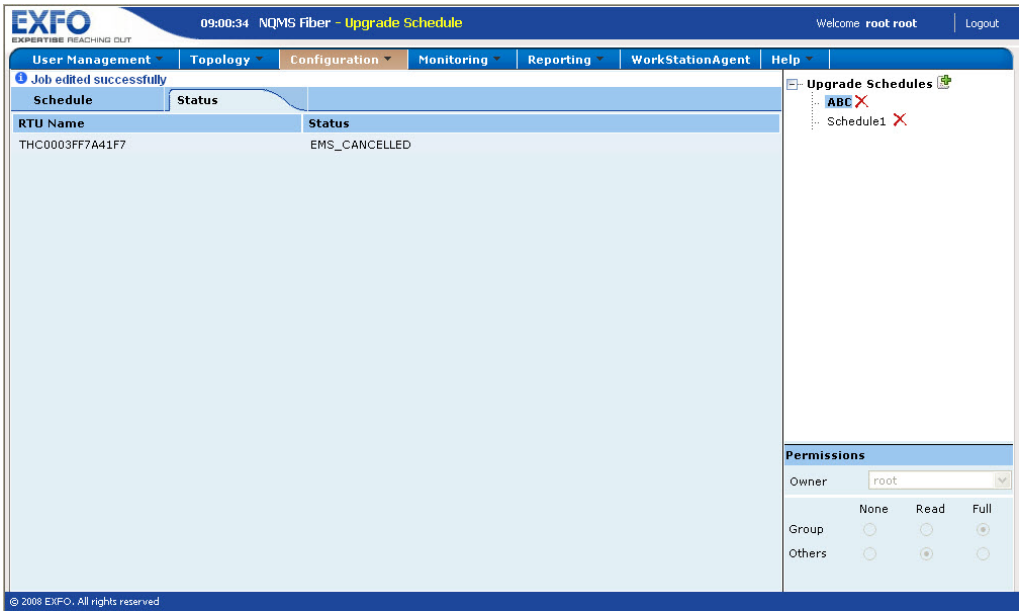
5. Click **Save** to apply your changes, or **Cancel** to discard them.

The software upgrade schedule gets saved and the system lists the RTUs and the status against each of them. The web service of the software schedule communicates with the selected RTUs and updates its status. If any RTU is not reachable, it updates the status to **Failed** indicating that the RTU is not reachable.

To view the Status of the selected RTU:

1. From the **Configuration** menu, select **Software Packages**.
2. Click **Status**.

   The **RTU Name** and the **Status** is displayed on the screen.



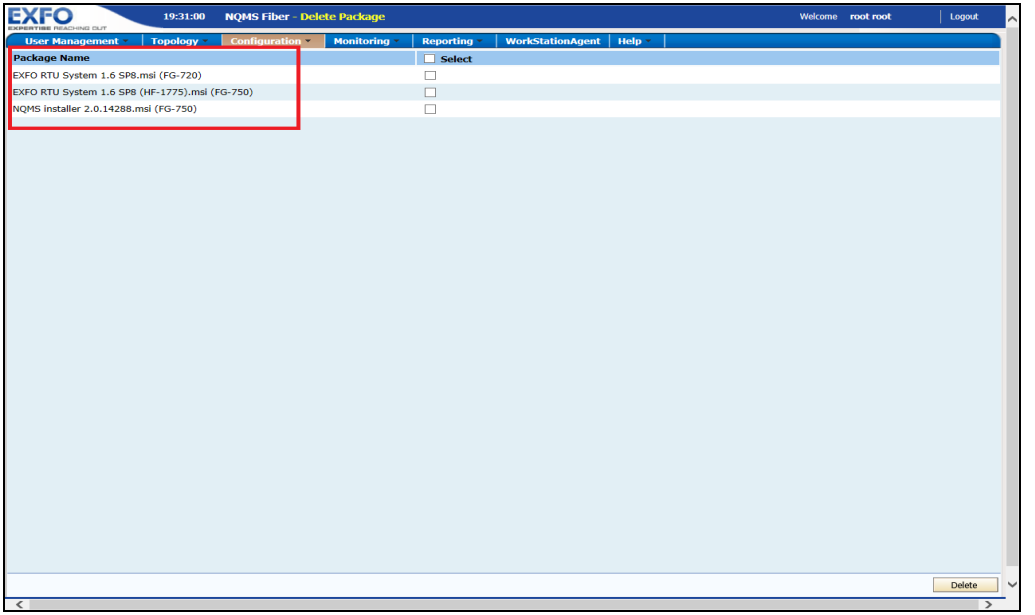
Examples of the **Status** displayed are the following:

- **EMS_CANCELLED**
- **SCHEDULED**
- **DOWNLOADED**
- **DOWNLOAD FAILED**
- **ACTIVATION FAILED**
- **CANCEL FAILED**
- **HISTORY**

If you ever need to make some space on the EMS, it is always possible to delete an old version of the software package.

To delete a package:

1. From the **Configuration** menu, select **Software Packages**.
2. Click **Delete Package**.
3. Select the **Package Name**(s) to be removed. For distinction, the corresponding RTU model numbers are appended to the package names, that is packages belonging to FG-750 or FG-720.



4. Click **Delete** button to confirm your selection.

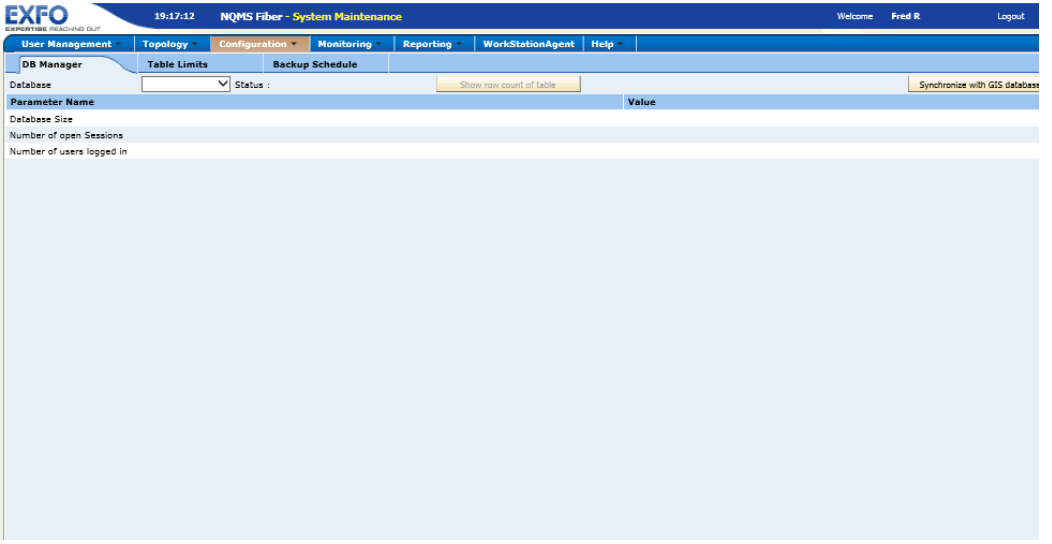
Scheduled Backup

NQMSfiber system provides a daily or a weekly option to backup the database. You have to input the values and the system performs the periodic backups according to the information provided. The backup is stored in the /log directory, which is the mount point.

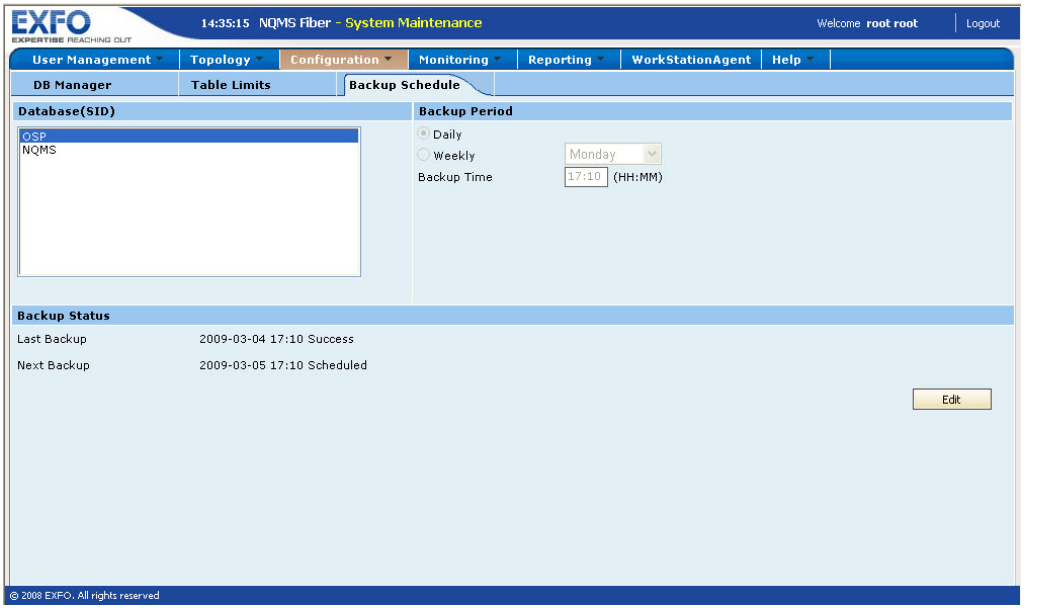
In Linux machine, the backup files are stored in /log/backup and in windows machine, back up files are stored in E:\log\backup. In IBM Red server there are total 6 partitions or logical drive: Logical drive1, RAID 1 (physical drive 0 and 1), Linux + NQMS+ Archive, Logical drive2, RAID 1 (physical drive 2 and 3), Database, Logical drive3, (physical drive 4), and the remaining 3 drives are mirror images of the first 3. Windows Network Admin can install the SAMBA and share Linux disk/folder and retrieve backup file.

To schedule a backup:

1. From the **Configuration** menu, select **System Maintenance**.



2. Click the **Backup Schedule** tab.



3. Click **Edit**.

4. Fill out the required information:

   - **Database (SID)**: select the database to be backedup.
   - **Backup Period**: select the backup period (either daily or weekly). You can select any particular day of the week for the weekly backup schedule.
   - **Backup Time**: enter the time in **(HH:MM)** format when the scheduled backup will take place.

Note: ***Backup Status*** *displays the date and time information about the previous and the next backup.*

5. Click **Save** to apply your changes or **Cancel** to discard them.

16 Troubleshooting

Help options for NQMSfiber are available on the Help menu.

Contacting the Technical Support Group

To obtain after-sales service or technical support for this product, contact EXFO at one of the following numbers. The Technical Support Group is available to take your calls from Monday to Friday, 8:00 a.m. to 7:00 p.m. (Eastern Time in North America).All inquiries regarding service, calibration and technical assistance should be directed to the Customer Service department:

Technical Support Group
400 Godin Avenue
Quebec (Quebec) G1M 2K2
CANADA

1 866 683-0155 (USA and Canada)
Tel.: 1 418 683-5498
Fax: 1 418 683-9224
support@exfo.com

For detailed information about technical support, and for a list of other worldwide locations, visit the EXFO Web site at www.exfo.com.

If you have comments or suggestions about this user documentation, you can send them to customer.feedback.manual@exfo.com.

Viewing User Documentation

Help on using the features in NQMSfiber is available on the user interface in a PDF format.

To view the documentation:

1. On the **Help** menu, click **About**.
2. Select the **Documentation** tab, click **nqms_user_manual.pdf**.

Note: *If you do not already have Adobe Acrobat Reader to view the PDF documents, or if you have an older version installed, you can download it directly from the Acrobat Web site.*

A Technical Specifications

IMPORTANT

The following technical specifications can change without notice. The information presented in this section is provided as a reference only. To obtain this product's most recent technical specifications, visit the EXFO Web site at *www.exfo.com*.

REMOTE TEST UNIT–PLATFORM		
Standard model–number of optical ports [a]	SC-APC or FC-APC	1/4/8/12/24/32 ports
Expandable model–number of optical ports	4-port SC-APC optical switch cassette (OSC) 8-port LC-APC OSC 12-port MTP-APC OSC Maximum eight (8) OSCs per unit Scalable, modular construction Field-configurable	8 to 96 ports [b]
Internal optical switch type	MEMs [c]	
Internal optical switch lifetime (minimum number of cycles)		1 000 000 000 (10^9)
MEMs external/remote optical switch	Refers also to M-OTAUs or MEMs-based optical test access units (SC-APC); DC or AC powered.	1U size: 1x8, 1x16, 1x32 2U size: 1x48, 1x72 4U size: 1x96
Large external/remote optical switch (1 x n) [d]	High number of ports	576/720 ports
Wired network interfacess	10/100/1000 Base-T Ethernet IP-V4 and V6, one dedicated to local access	2
Unit status front LEDs		5
Storage type and data storage (GB)	Solid state drive	32
Dual, hot-swappable and redundant power supplies	Rear swap, AC or DC	VAC 100 to 240, 50/60 Hz VDC –40/–72
Power consumption steady state (fully loaded with 96 ports)	Over entire operating temperature range	35 W
Fan	Field replaceable Front loading	1
Rack type	Drawer on rail	
Supported browsers for unit configuration and status view	MS Internet Explorer™, Mozilla Firefox®, Google Chrome™	
Temperature	Operating Storage	–5 °C to 50 °C (23 °F to 122 °F) –40 °C to 70 °C (–40 °F to 158 °F)
Relative humidity	Non-condensing	0% to 95%
Maximum operation altitude [e]		3000 m (9850 ft)
Size (for 19-in, ETSI or 23-in racks) (H x W x D)	Fits in 300 mm deep ETSI rack with cabling (DC model) connected	88 mm (2U) x 435 mm x 270 mm (3 7/16 in (2U) x 17 1/8 in x 10 5/8 in)
Maximum weight (with 8 OSCs)		8.7 kg (19.1 lb)
Product Compliance	CE, CSA, RoHS, NEBS [f]	
Wireless network interface option	Integrated wireless communication module with external antenna (SIM not included; some conditions such as level of signal inside premises apply)	HSPA+, GSM/GPRS/EDGE and CDMA 1x RTT

SOFTWARE OPTIONS AND OPTIONAL ACCESSORIES

Ordering		Description	
	NQMS-SERV-STD		Connect to NQMS*fiber* Element Management Server application; Standard Edition
	NQMS-SERV-ENT		Connect to NQMS*fiber* Element Management Server application; Enterprise Edition
	SW-FTI		Fiber Test InSight for Google Maps and Open Street Maps; fault-on-map web-server application software
	OSC-4-SC		1x4 optical switch cassette in SC-APC
	OSC-8-LC		1x8 optical switch cassette in LC-APC
	OSC-12-MTP		1x12 optical switch cassette in MTP-APC
	GP-3059		17-in wired antenna for wireless interface option
	GP-3061		High-reflectance demarcation filter in a SC-APC bulkhead adapter
	GP-3062		High-reflectance demarcation filter in a SC-UPC bulkhead adapter
	GP-3063		High-reflectance demarcation filter–SC-APC pigtail
	GP-3064		High-reflectance demarcation filter–SC-UPC pigtail
	GP-3065		Test jumper management tray (attach to unit front)

Notes

a. One port is without internal MEMs switch for connection to external OTAU.

b. 96 ports with MTP-type OSCs.

c. Micro-electromechanical system.

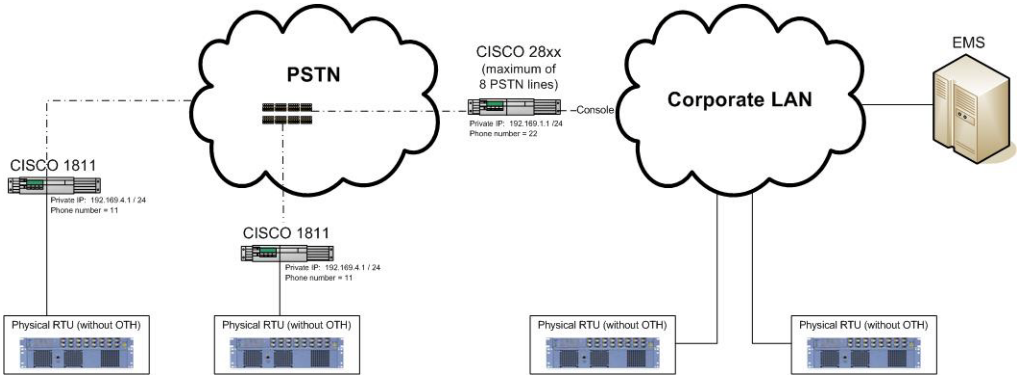
d. Optomechanical-type optical switch.

e. Operation at higher elevations is possible but restricts the maximum temperature at which the unit can operate; consult the factory for more details.

f. The equipment is NEBS-compliant based on Verizon VZ.TPR.9303 Issue 1, March 2007 for test and measurement equipment–permanent installation, and AT&T ATT-TP-76200 (Carrier Grade Level 1). Contact factory or visit the following URL for more details about this certification: www.verizonnebs.com/TPRs/VZ-TPR-9303.pdf

B Low Bandwidth Support

The EMS application can support communication with remote test units (RTUs) over a local area network (LAN), or via a modem for those units that are not connected to a LAN. All communications are channeled through a router. The router directs the requests to the EMS application. The communication via modem is slower than via LAN. When communication is made via modem, the EMS application simply gives the units more time to respond. The diagram below shows the settings for a low-bandwidth environment:



In the diagram above, there are physical RTUs communicating with the EMS over PSTN lines, whereas other RTUs are connected to the LAN.

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Printed in Canada (2017-09)

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