

# NQMSfiber Report Dashboard

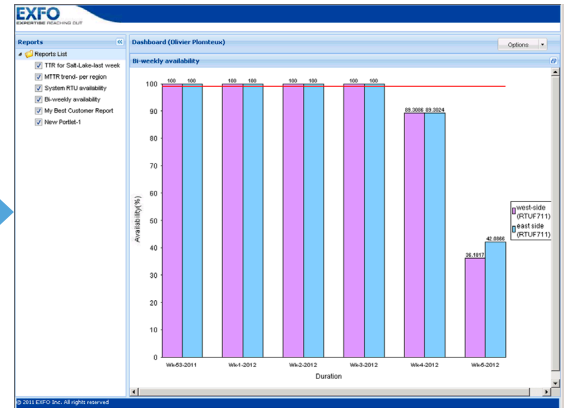
## HOW TO MEASURE AND IMPROVE YOUR FIBER NETWORK AVAILABILITY

### Why this tool?

- › Provides network KPIs to operations managers
- › Identifies, pinpoints and rectifies major MTTR issues
- › Tracks the availability of the entire cable (dark fiber cases)
- › Tracks the availability of the leased fiber and related services (in-service cases)



Dashboard with all six fixed-size “widgets”.



One of the widgets in full view.

## REPORT DASHBOARD BENEFITS

- › **Comprehensive** view of network performance
- › Identify **trends** and act before it is too late
- › Measure **customer impact**
- › **Report** to your customers and prove your conformance to the agreed SLA
- › **Measure and improve** your teams’ performance
- › **Pinpoint** recurrent issues
- › **Increase your business** in the competitive managed services market
- › **Automate** some of your existing manual reporting processes

## DATA SOURCES

The data populating the report dashboard are “alarms” that are active from the time they are opened, to the time they are resolved. A report is therefore linked to a unique alarm type/source. For each report, users can determine the level of severity above which the fiber(s) are considered “out-of-service”, and specify a period for which the report should be generated.

- › **Fiber network reports:** any alarm type for which the data source is fiber-fault-related and links to a specific optical route.
- › **Test system reports:** any alarm type for which the data source is system-status-related, e.g., an RTU (OTDR based remote test unit) alarm type, such as “RTU unreachable”.

## TYPE OF REPORTS

### Availability (%) in bar graph, line or grid (table)

- › Percentage of time during the selected period for which one or a group of optical routes were available. For example, for a group of 10 routes, if one is down for the entire period, we get 90% availability for the group, and 0% for that one problematic fiber route. If the same route is down for 10% of the entire period, then group availability is 99%, etc.
- › Usually, annual network/fiber availability should be in the range of 99.9% or better, which represents only a few hours of service failure over the course of the whole year.

### MTTR trend in bar graph, line or grid (table)

- › Mean time to repair (MTTR) is obtained by dividing the total corrective maintenance time by the total number of corrective maintenance events during a given period.
- › With the NQMS *fiber*, it is the addition of all alarm durations for the selected fibers, divided by the number of alarms. For example, for 10 routes selected, if only one alarm occurred and lasted 9.5 hours before it was resolved, we get an MTTR of 9.5 hours. If two alarms occurred for the same group, but the second alarm was resolved in 0.5 hour, the MTTR value is then 5 hours, etc.
- › The MTTR “trend” means that the ratio is presented within its time frame, so users can know when MTTR increased, or changed significantly, within the whole period selected.
- › Users can then dig/nest in the data to find out which route(s) were affected (e.g., if the initial grouping is large).

### TTR distribution in grid (table), pie chart and bar chart

- › The time to repair (TTR) distribution report provides a statistical analysis of how many fiber-fault alarms were resolved within specified time slots, such as how many alarms were resolved within 0-2 hours, within 2-4 hours, etc., for a specific group of routes.

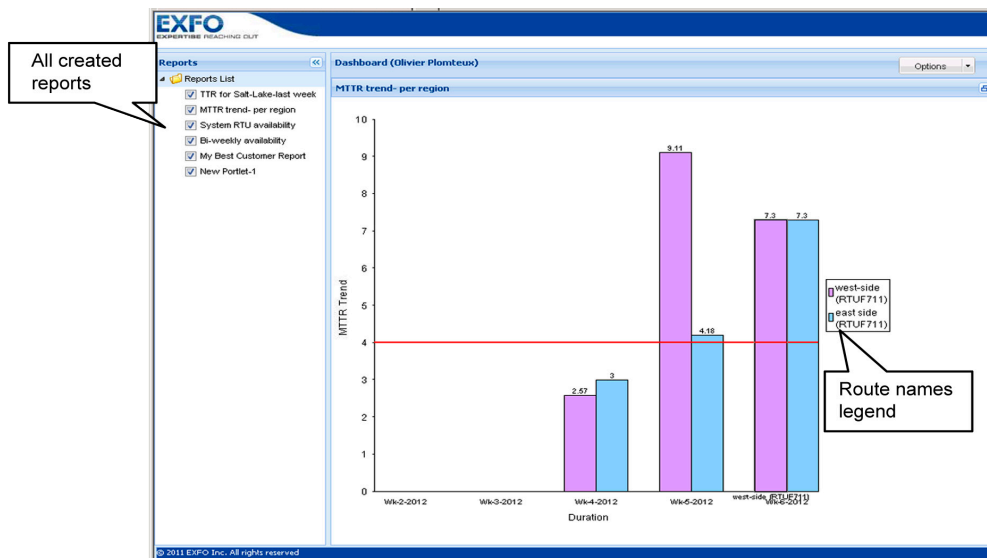
### Fiber-fault-alarm distribution in grid (table), pie chart and bar chart

- › This report quantifies the alarms and assesses their severity for the selected group of routes.

## AGGREGATION

Grouping enables reports to present an aggregate of routes, either:

- › **Per route**, providing a bar level, a point on a line graph or a value in a grid—for each route
- › **Per RTU**, with all routes connecting to an RTU contributing to the calculated value or statistic. Availability is typically calculated for the entire set of routes under each RTU, and all RTUs are displayed with their respective percentage (below is an example with four RTUs)



- › **Per region**, similarly with all regions presented in one single view
- › **Per customer**, in this case irrespective of routes, RTUs or regions. As long as a customer is associated with one or multiple routes from many RTUs and regions, per-customer aggregation will show all customers in one widget. Users can then dig into one region to filter out only one particular customer.

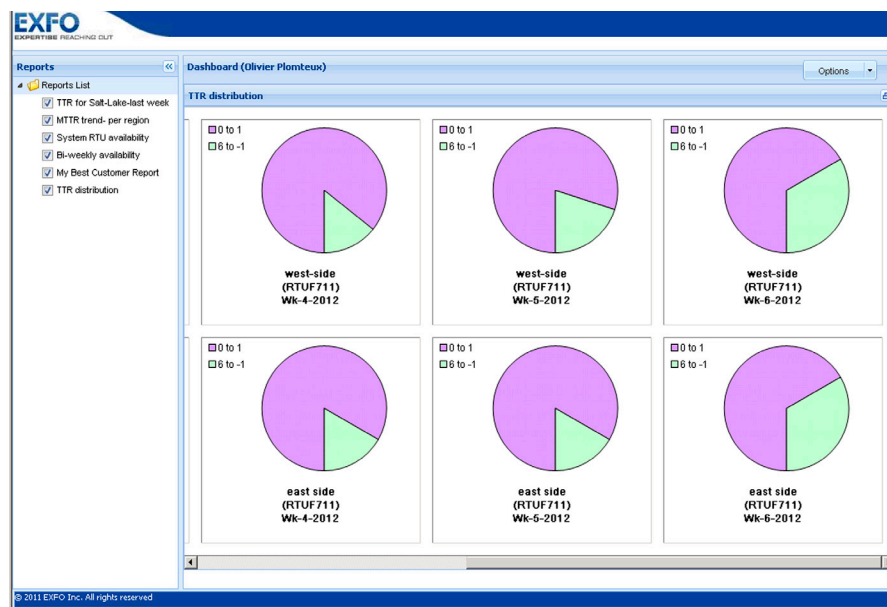
## CHART TYPES

As stated above, values from a given widget can be displayed in various formats, depending on the type of report. Supported formats are:

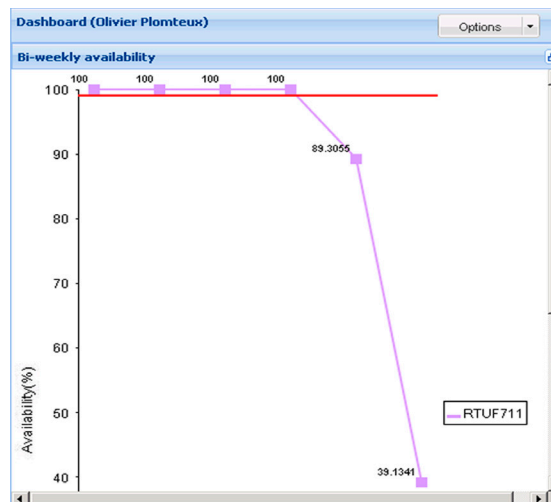
- › **Grid**, a table style that presents all values directly; useful for detailed view of numerous values

RTU	Wk-53-2011 (26-Dec-2011 To 31-Dec-2011)		Wk-1-2012 (1-Jan-2012 To 7-Jan-2012)		Wk-2-2012 (8-Jan-2012 To 14-Jan-2012)		Wk-3-2012 (15-Jan-2012 To 21-Jan-2012)		Wk-4-2012 (22-Jan-2012 To 28-Jan-2012)		Wk-5-2012 (29-Jan-2012 To 1-Feb-2012)	
	Availability %	Non Availability %	Availability %	Non Availability %	Availability %	Non Availability %	Availability %	Non Availability %	Availability %	Non Availability %	Availability %	Non Availability %
RTUF711	100	0	100	0	100	0	100	0	89.3055	10.6945	39.1341	60.8659

- › **Pie chart**, which perfectly suits distribution-type reports



- › **Line**, for trending analysis

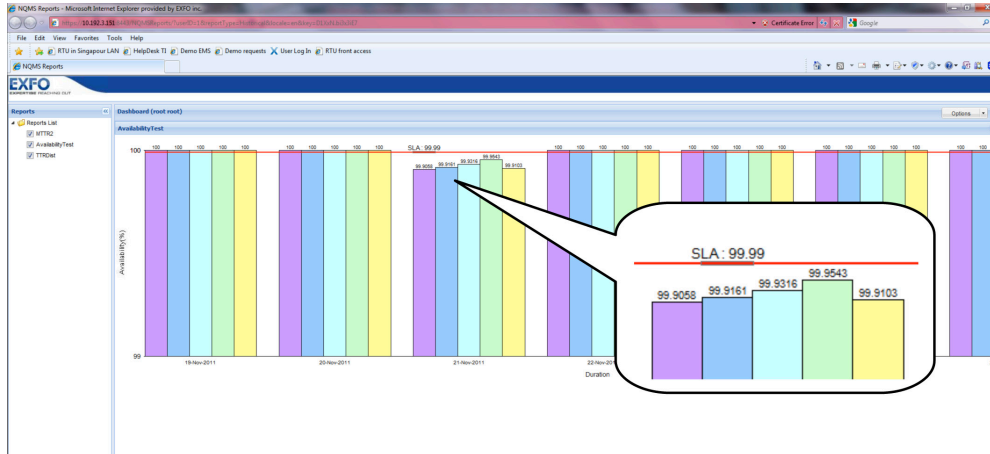


- › **Bar**, ideal for heavily aggregated reports as well as for trending analysis

## SLA

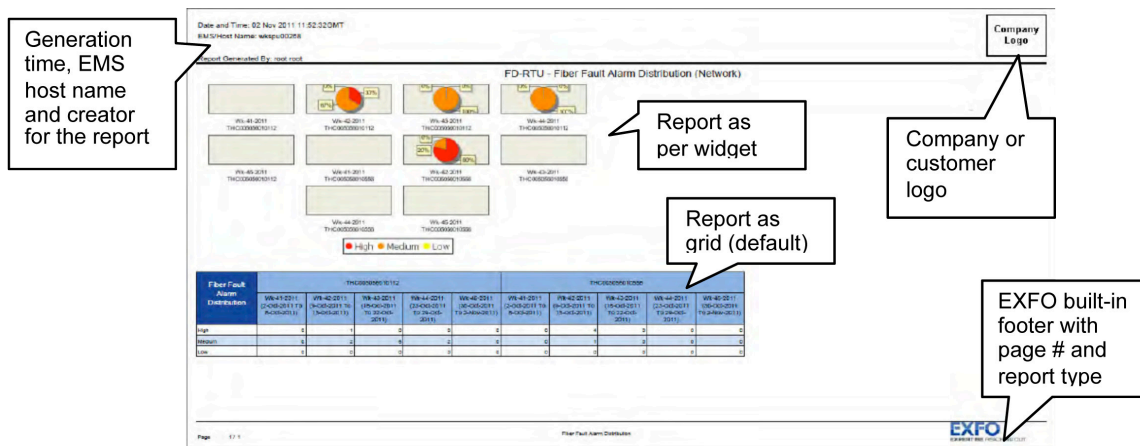
For availability and MTTR trend reports, users can display the service-level agreement level (red line in the graph below).

- › The MTTR SLA level is expressed in hours (e.g., all fiber alarms above a certain severity should be resolved in less than four hours).
- › The availability SLA level is expressed in percentage, such as 99% or 99.999%, depending on how stringent is the managed services contract.



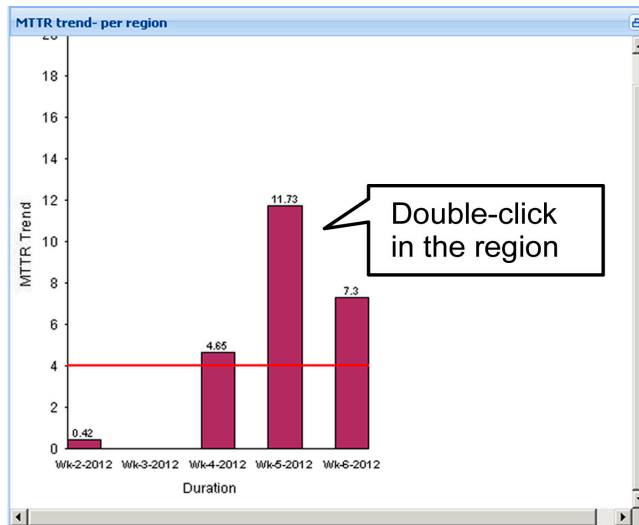
## OTHER FEATURES

- › **Per-user dashboard:** each user can create their own specific dashboard.
- › **On-the-fly PDF print:** available for each widget.
- › **Scheduled generation report sets:** predefine reports for one or a combination of widgets (multiple pages) up to 6 MB.

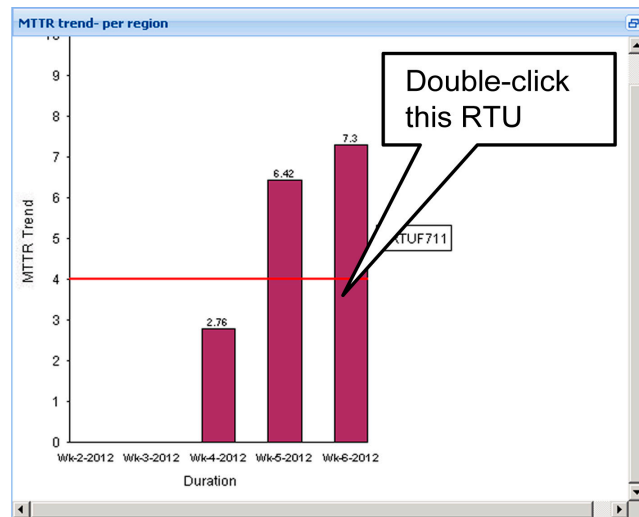


**Report sets (.pdf)** include one or multiple reports, by default with grid values and the chart type selected on the widget. They can then be scheduled for generation.

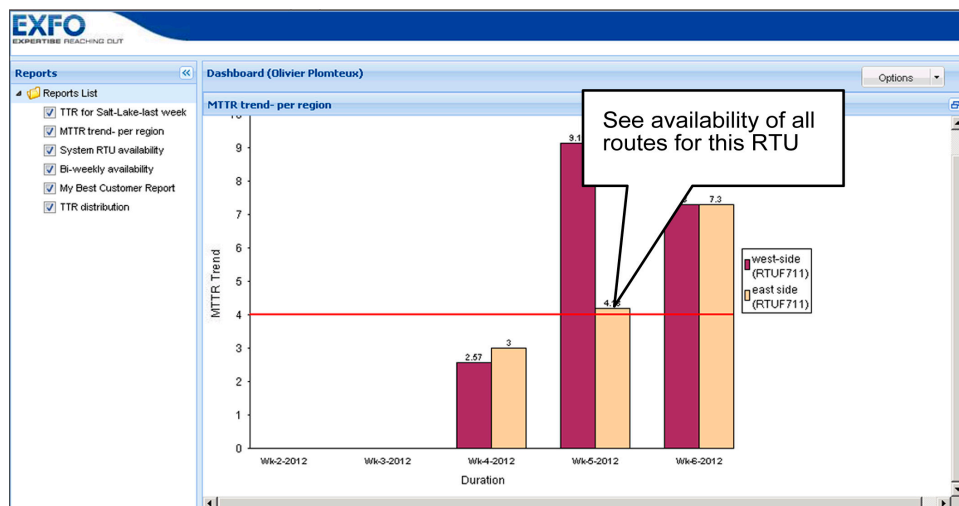
› **Group nesting:** find the single source (e.g., route) that caused the high value reported.



Quarterly availability report for a given region with a poor percentage in the last month.



Per-RTU view of the same region after drill-down into the region.



Per-route view of the same region after drill-down into the region.

## TRENDING TOOL FOR QUALITY-CONTROL MANAGERS

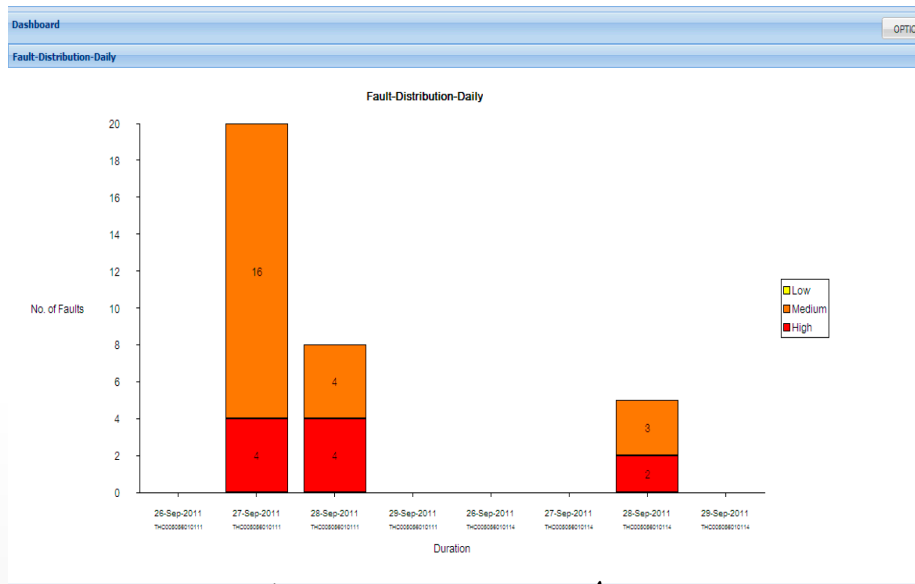
It is important to highlight that with the NQMSfiber, an alarm type can be created based on any fault condition, severe or not in terms of availability. If fault detection thresholds are set “tight” and for a specific analysis such as event loss, section loss or total attenuation, and a specific alarm is created for this special case, we can therefore extend the capabilities to perform trending analysis on the fiber quality/aging.

Below is an example of a medium-severity alarm definition for a quality-control manager who wants to use the **report dashboard** as a trending tool, and has therefore defined a test setup that will run every day or twice a day, will be classified as a preventive test setup, and could only be tracking the total attenuation value of the fiber under test.

Preventive alarm type example, set as medium or low severity:

Parameter	Operator	Value	AND/OR
Fault type	Equal	Degradation	And
Fault status	Equal	Not cleared	And
Fault degradation	Lower than	1 dB	And
Test setup type	Equal	Preventive maintenance	And

**Quality-control managers** can therefore create preventive alarm types for small degradations and use the exact same tool for maintenance activities. They can define one alarm type with less severe actual impact on the network, and build their own dashboard with the same exact tool that **operations managers** use to track the more critical failures, such as MTTR, TTR distribution and availability. Fault distribution reports (below) help identify where the network is the most unstable.



West route alarms per day for 1 week period

East route alarms per day for 1 week period



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