CloudView NMS: Monitoring Fiber Network Infrastructure with Optical Zonu's SFP OTDR Devices – Application Notes

www.cloudviewnms.com

We are currently developing user manuals to capture the full richness of the CloudView GUI. While there's a lot to cover, the current version includes just enough information to get you started with the topic above. To access the latest documentation, please install the most recent version of CloudView (or the 30-day CloudView Trial—both are the same package).

Contents

1. Preface

Support for Optical Zonu's **SFP OTDR** Devices was added to CloudView NMS starting with version 2.39n5, released on June 14, 2025. While version 2.39n5 includes this functionality, we strongly recommend upgrading to the latest version, available at https://cloudviewnms.com/download.html , for optimal performance and the most up-to-date features. Please follow the instructions provided in the link above to install CloudView NMS on the computer platform running the operating system of your choice.

CloudView NMS supports all of Optical Zonu's SFP OTDR-enabled devices, including:

1. **ZonuConnect**, a BTS-to-DAS fiber link system that integrates Micro-OTDR functionality for real-time fault detection and distance localization.
2. **S11 Media Converter**, a specialized networking device that establishes an Ethernet data link over an optical fiber path while simultaneously monitoring for fiber faults. It supports media conversion between 10/100/1000Base-T copper and 1000Base-EX/ZX fiber ports.
3. **S14**, a compact, managed Ethernet switch designed for high-density deployments and remote fiber monitoring. It features four RJ-45 ports and one SFP port, supporting 100/1000 Mbps Ethernet.

What sets Optical Zonu's SFP OTDR devices apart is their integration with Micro-OTDR SFP (uOTDR) modules, which enable precise detection and reporting of fiber faults—pinpointing the distance to a break within a few feet. Unlike standalone OTDR devices, a uOTDR is **built directly into an SFP transceiver** (Optical Zonu's iSFC® series). When a fiber link is disrupted—say, due to a break or poor splice—the uOTDR mode kicks in automatically. It sends out high-powered optical pulses (typically > +13 dBm) and measures the reflected signals to pinpoint the fault location, even detecting reflections as faint as -42 dBm.
Key benefits include:

- **Fast fault detection and location**, reducing Mean-Time-To-Repair (MTTR)
- **No need for external test equipment**
- **Remote monitoring** from one or both ends of the fiber
- **Compact form factor**, ideal for embedded network diagnostics

Additionally, these devices support SNMP v2/v3 management for centralized monitoring and control.

CloudView NMS displays visual and graphical representations of SFP OTDR data and links, which can be overlaid on the management panel. To configure a link in CloudView NMS, users must add two device icons to the map as fiber endpoints and accurately lay out a fiber link line between them. Currently, to display fiber reflections and cuts (OTDR data) along the link line, at least one of the devices must be of the "OZONU" device type. Once the links are properly configured, users can clearly view fiber reflections or faults on the map overlay and receive corresponding alerts 24/7 when the fiber infrastructure is broken or damaged.

2. Overview of a Fully Configured System

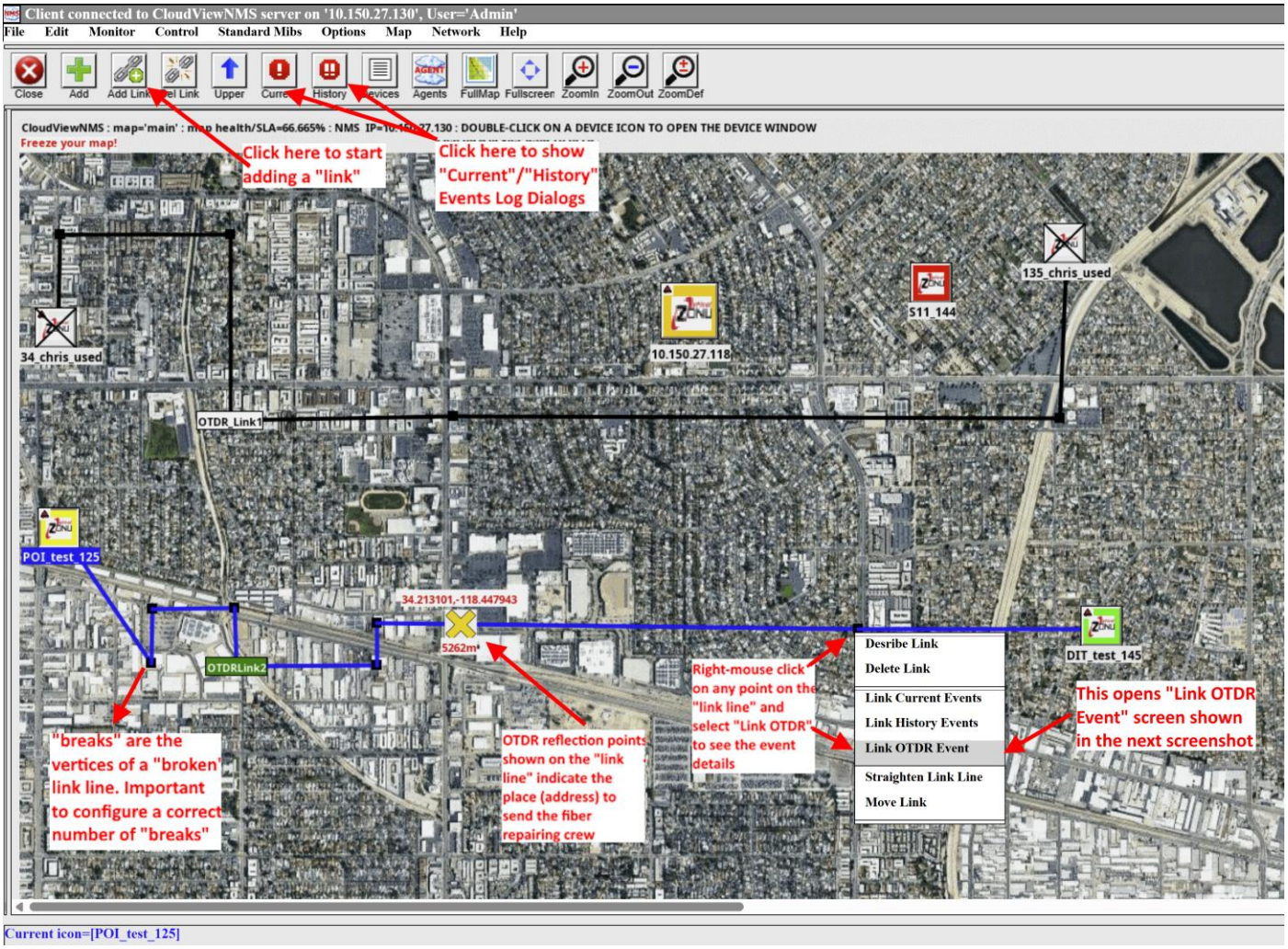
The screenshot below shows a configured “fiber link line” in the CloudView NMS GUI, along with several overlaid annotations. Please note the following:

- **Example Interface**: We used the CloudView NMS HTML5 Web GUI (accessible via a web browser) as an example. The interface will look similar in other CloudView NMS GUIs, including the stand-alone server application GUI and the Independent Client GUI.

- ⚠ **Important:** If you notice that dragging “break points” or device icons feels sluggish or imprecise, it's likely due to insufficient computing power on the machine running the CloudView NMS server. Network monitoring is a critical task—it can save you significant time and money when diagnosing and resolving issues. For this reason, we strongly recommend running the server on a high-performance computer, particularly one with robust CPU and RAM resources, right from the start. It's difficult to specify exact CPU or memory requirements, as they vary depending on factors such as the polling intervals, number of devices and fiber links being monitored. However, a good rule of thumb is this: if the web interface feels slow, inadequate server performance is the most probable cause. 💡 **Note:** The “local” stand-alone server application GUI may still remain responsive, but most of our customers primarily use the web interface, which is the recommended option for several reasons.

- **Configuring the Link**: When setting up a “link,” it is important to define the correct number of “breaks” in the link line to accurately reflect the actual fiber path. These “breaks” are draggable, allowing you to align the “link line” with the real-life fiber route.

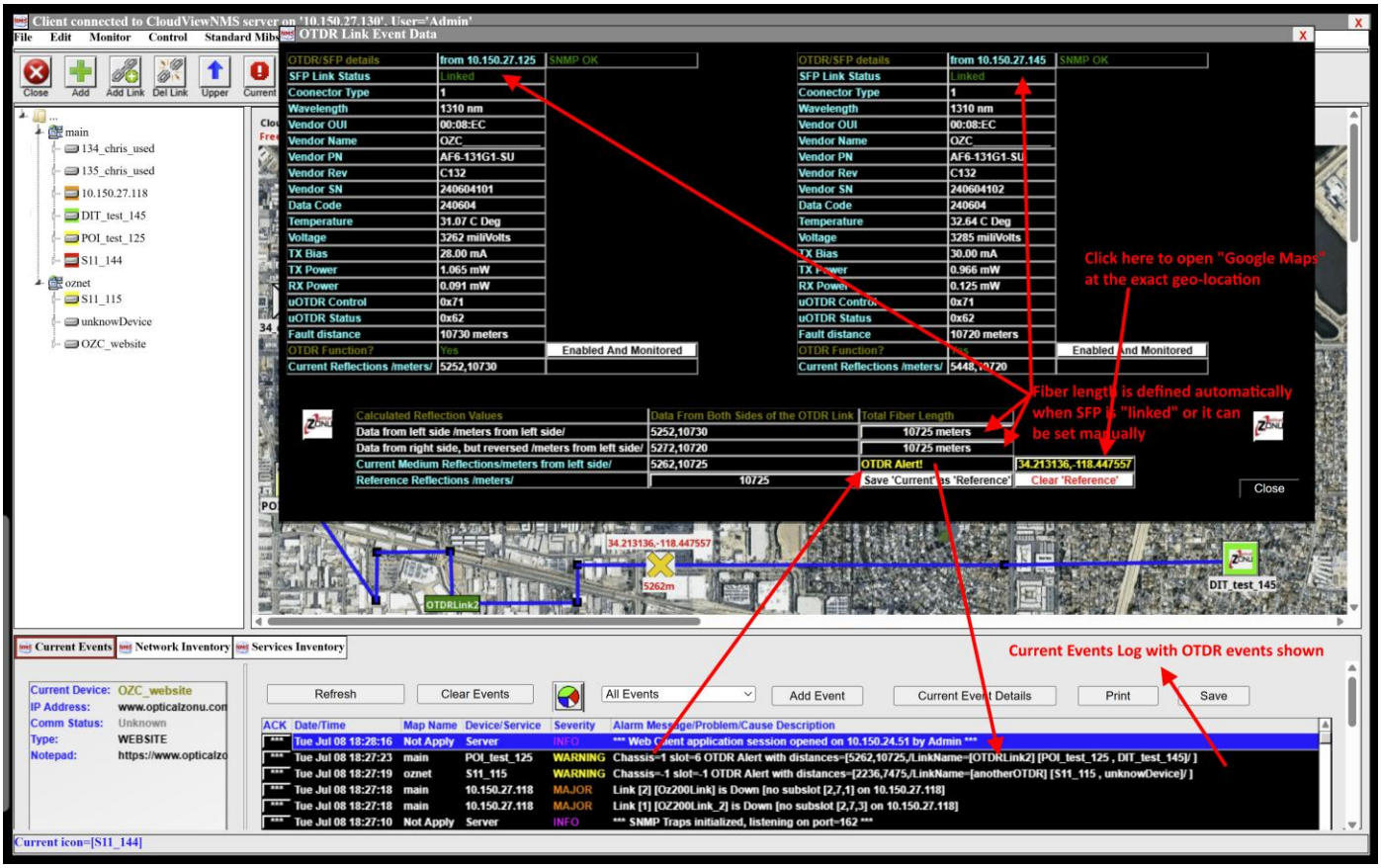
- **Device Types**: In the example below, the link connects two devices of the “OZONU” type. However, there may be scenarios where one end of the link involves a third-party device or simply an “open fiber” configuration (i.e., a single-ended, unlinked dark fiber). In such cases, the other end of the link can be configured as a CloudView NMS device of type “Unknown.” This device type does not support polling or monitoring. That said, CloudView NMS supports a wide range of other device types that implement polling through standard protocols. Using these types can offer additional benefits, as network issues may stem not only from fiber faults but also from broader device functionality or availability problems.



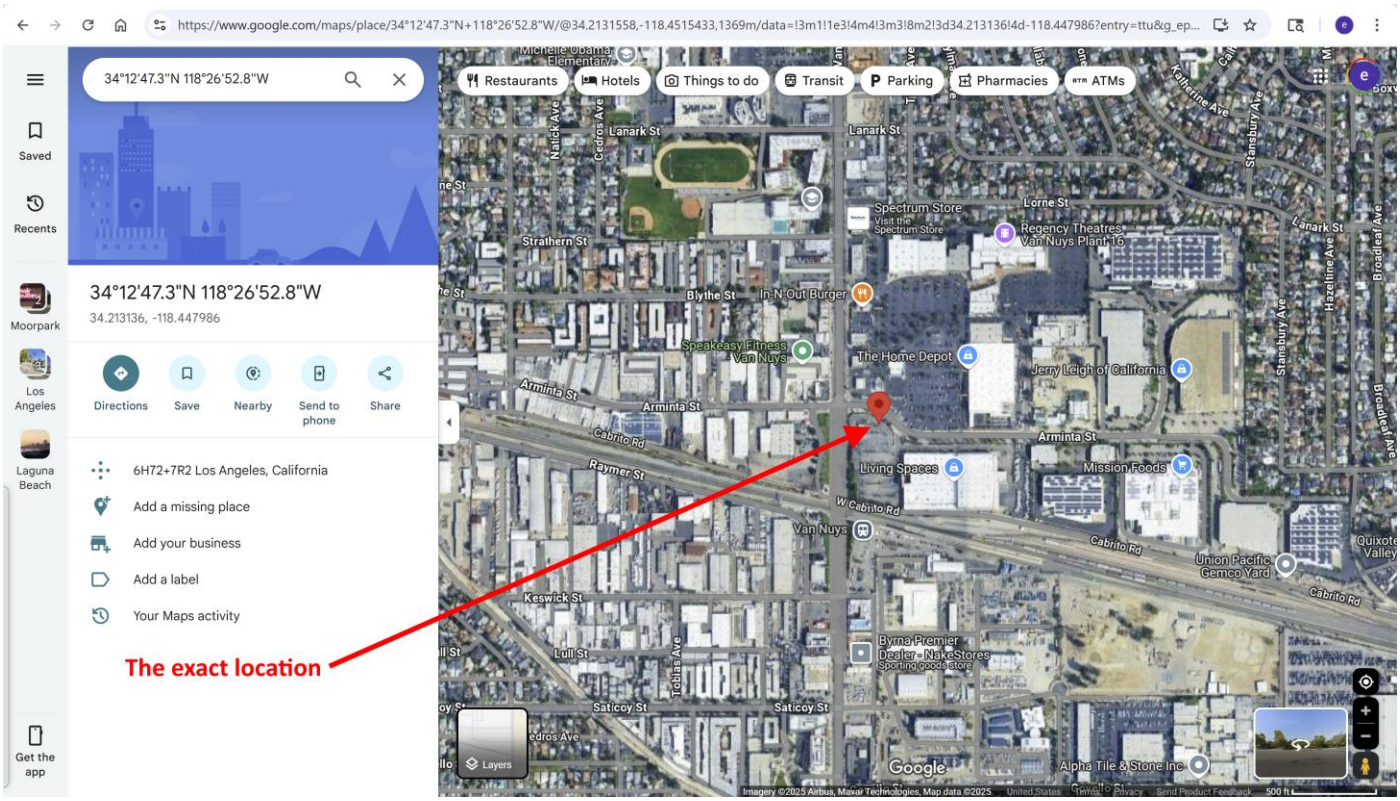
The interactive GUI displayed above allows you to view your entire network infrastructure with color-coded events.

A summary of CloudView NMS events—including OTDR events for multiple links—is displayed in chronological order in the CloudView NMS Events Log dialogs (the "**Current Events Log**" and "**History Events Log**" screens). It is important to note that all history events are stored in an SQL database. Events can be forwarded via email, SMS, SNMP traps, syslog messages, and other interfaces. Right-clicking at a link-line break point displays a link-specific pop-up menu that includes a menu item to show the link's latest OTDR event details.

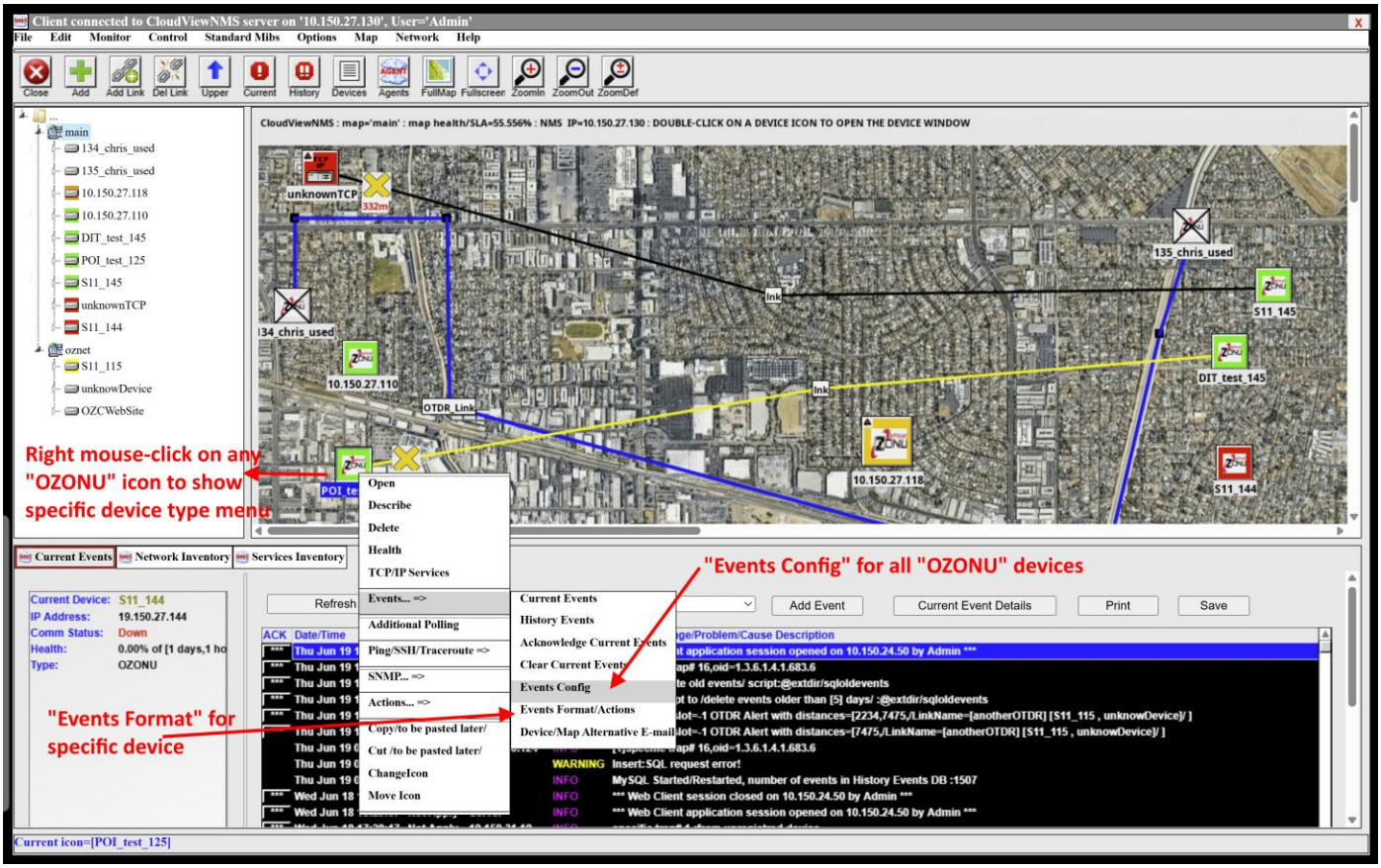
When a link is configured, Optical Zonu devices on both sides (or just one side) of the link are polled (via SNMP) every 10 seconds (configurable polling interval) to detect changes in reflection distances and trigger alarms (events). The measured reflections are compared against the **reference reflections**, which are set once during link configuration. Reference reflections can be configured either by pressing the "*Save 'Current' as Reference*" button or manually (see the screenshot below).

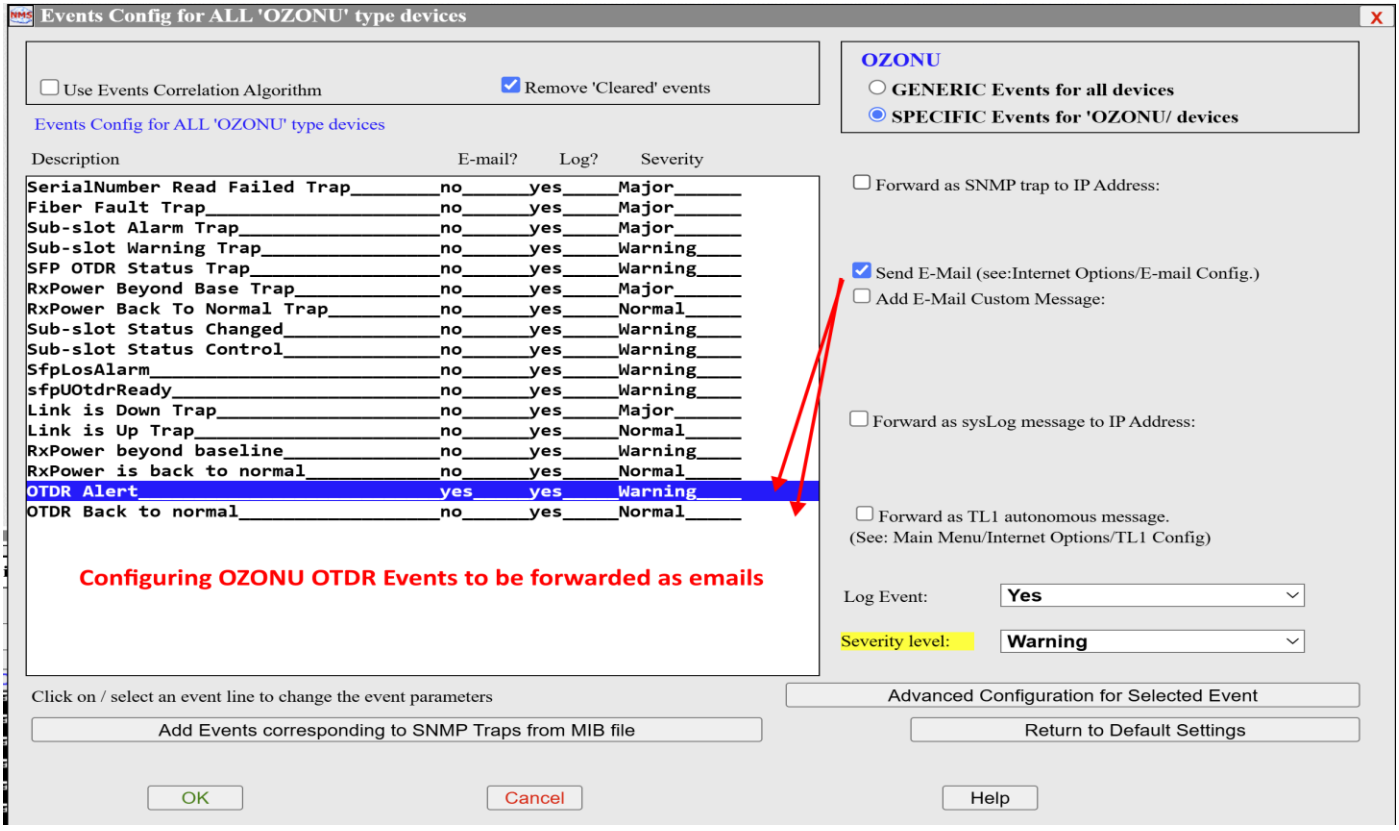


Clicking on the yellow geo-coordinates in the above screen or anywhere on the background image —earlier retrieved from Google Maps— will open Google Maps at that exact location. This enables a thorough exploration of the area—leveraging the full feature set of Google Maps, see the below screenshot.



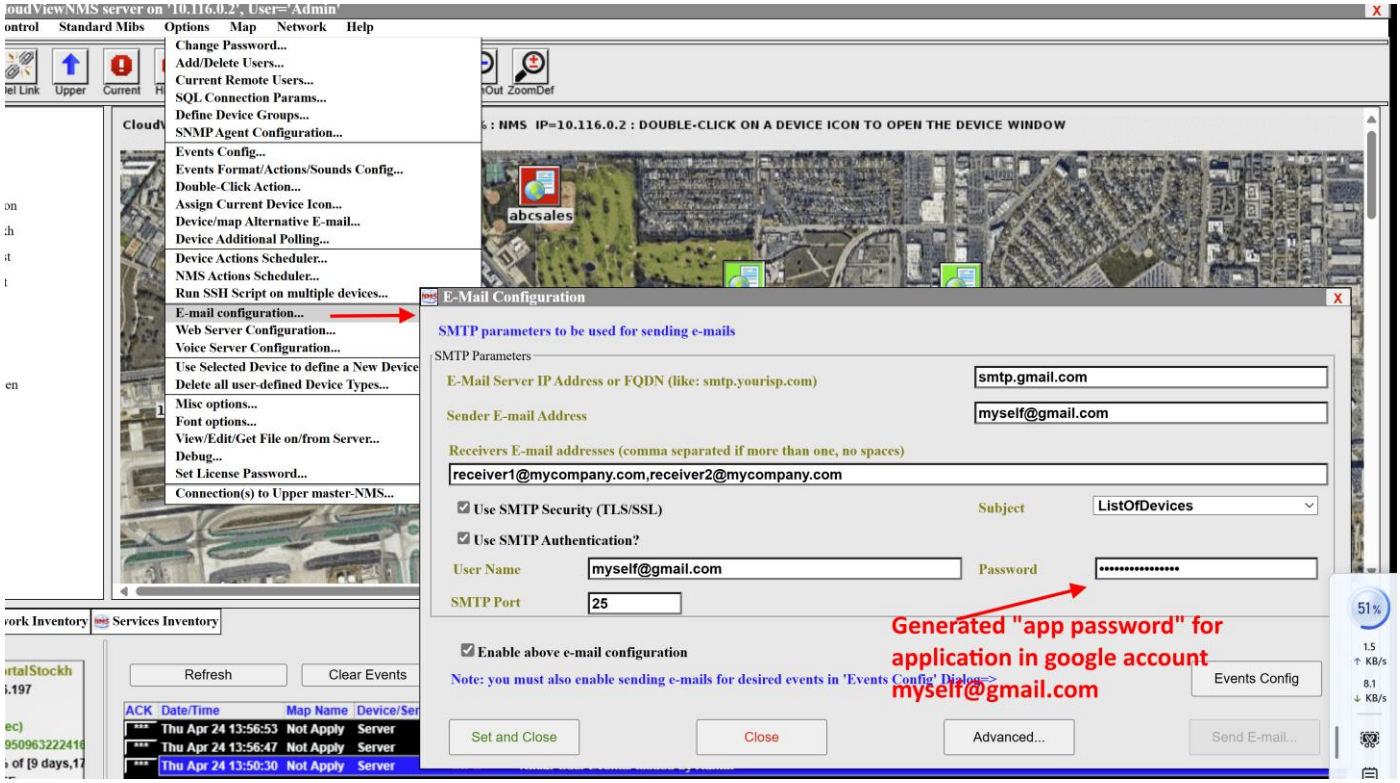
To forward an event, for example, as an email, the user must first configure the event. The “Events Config” menu appears when you right-click on any “OZONU” icon. Note that this is not the “link” menu (as shown in the screenshot above); we will discuss that later. Please see the screenshots below for an example of an OZONU device-specific menu and the corresponding **Events Config** window, which is invoked by this menu.





Please note that in the above screenshot, some events correspond to SNMP traps from OZONU devices, while others do not. It is important to note that you do not need to enable—or rely on—device's SNMP traps to achieve the desired functionality. CloudView NMS polls the devices 24/7 using a predefined polling interval (the default is 10 seconds) and generates events and alarms automatically. In the screenshot, the events of interest are "**OTDR Alert**" with a severity of **Warning** and "**OTDR Back to Normal**" with a severity of **Normal**.

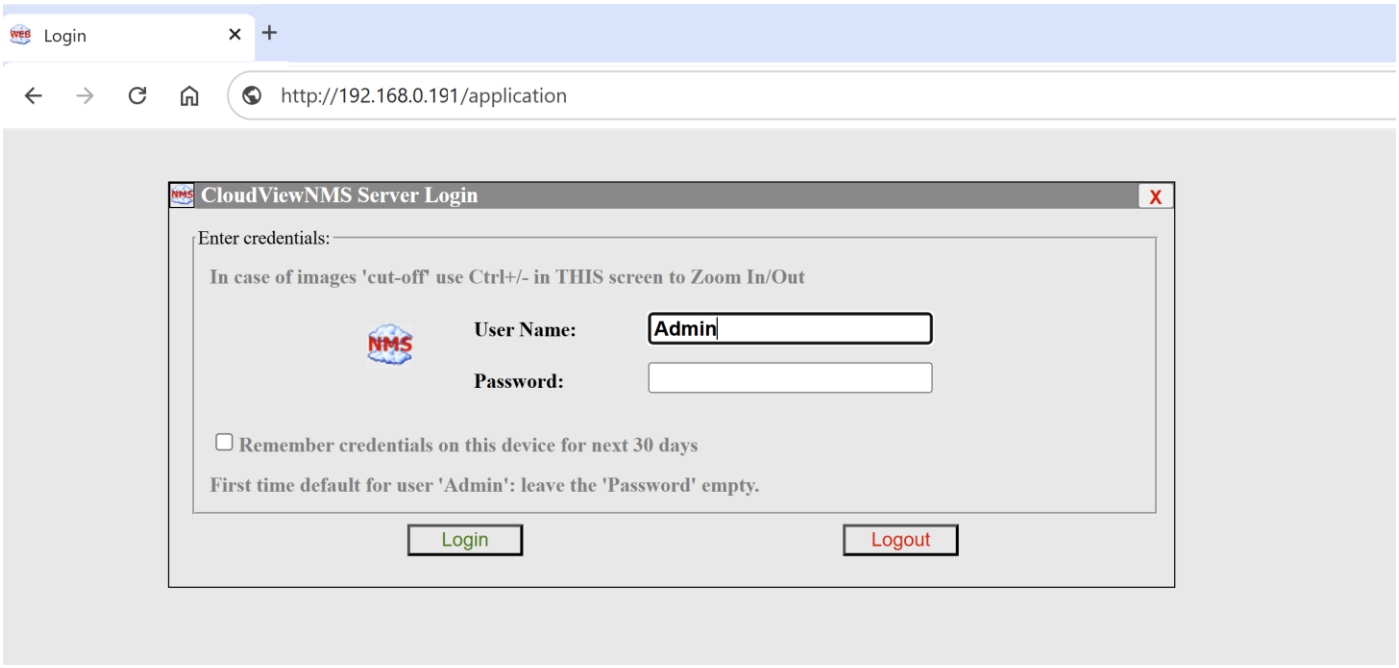
CloudView NMS **"forwarding events via e-mail"** feature can be used for sending events/alerts as emails and SMS messages. It must be configured via "Main Menu->Options->Email Configuration" or "Main Menu->Internet Options->Email Configuration" see the below screenshot.



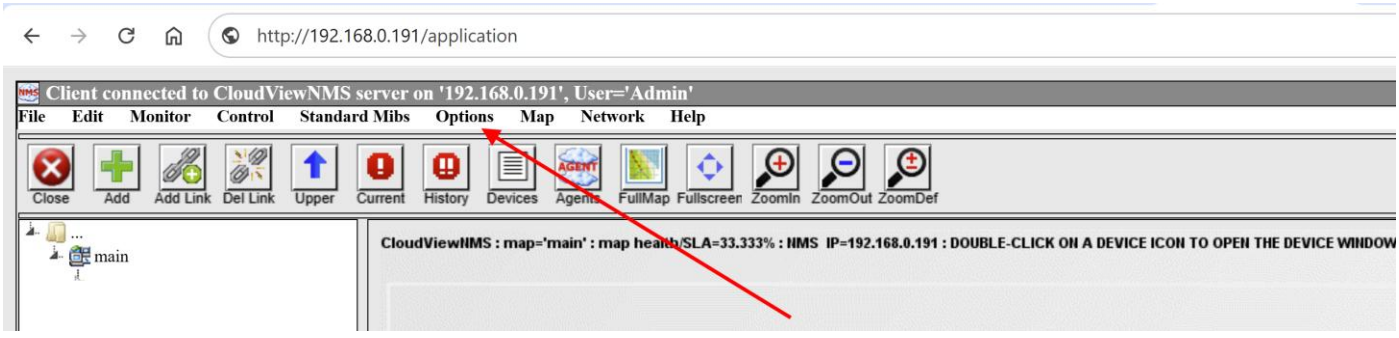
3. Quick Start: Configuration from Scratch

3.1 Logging In via Web Browser

Now, let us briefly describe how we achieved the configuration shown above. After installing the CloudView NMS trial, the web server runs on port 80, and users can connect using a web browser by navigating to http://<ServerIpAddress>application (see the screenshot below).

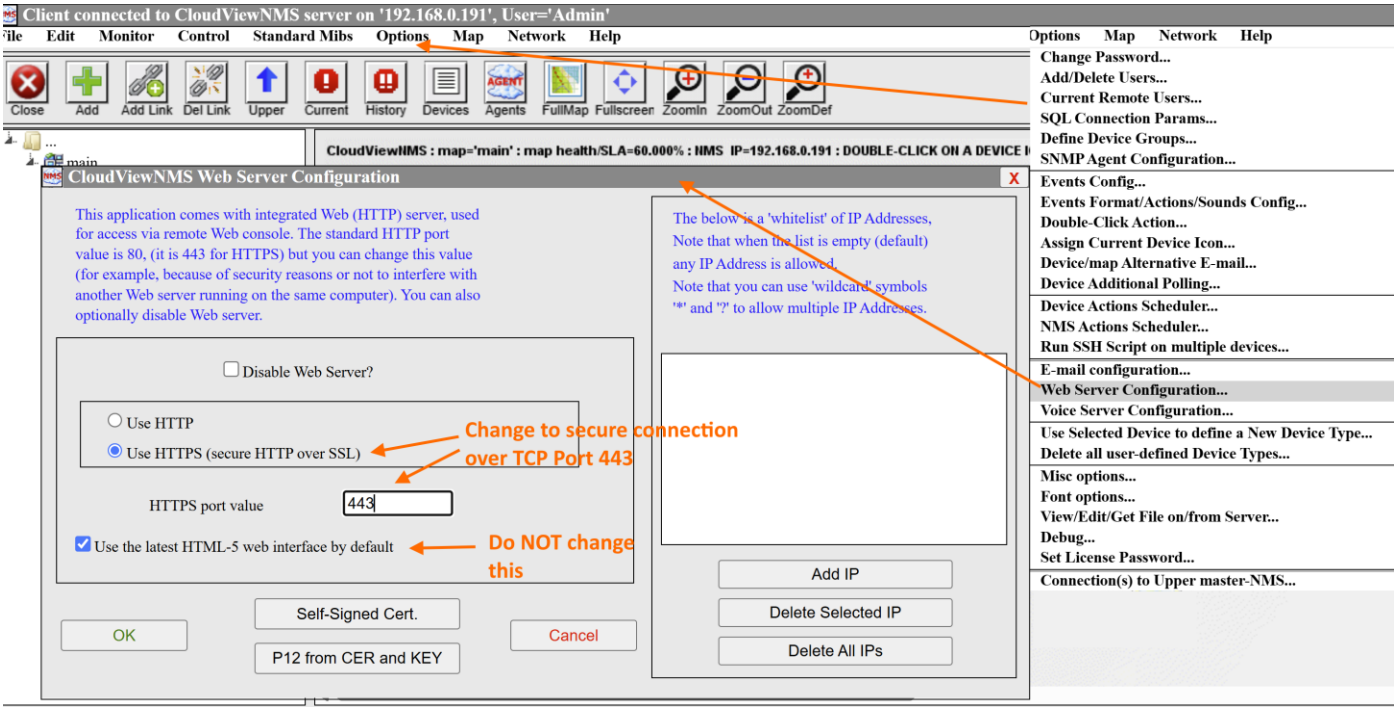


The default login credentials are: username “Admin” with an empty password. You will need to change these defaults later.



3.2 Setting the Admin Password and Configuring the Web Server

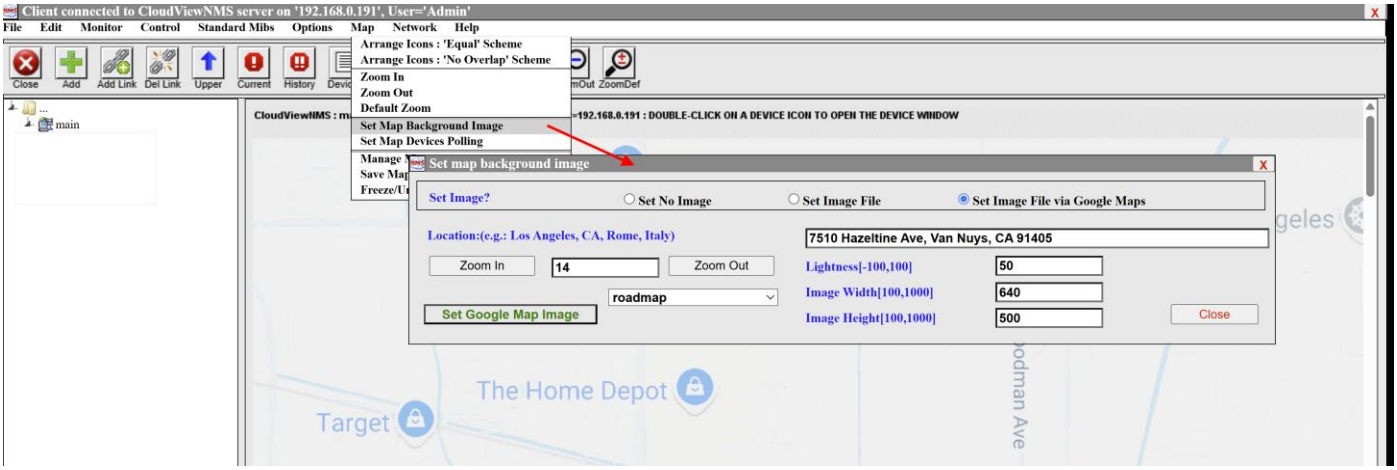
The first step is to change the Admin password via **Main Menu > Options > Change Password**. Next, update the connection to HTTPS over port 443 using **Main Menu > Options > Web Server Configuration** (see the screenshot below).



You may need to restart the CloudView NMS server a couple of times during or after completing the steps above.

3.3 Setting the Map Background Image

So, we start with an empty "main" map. Let's add a background image using **Main Menu → Map → Set Map Background Image** screen (see the below screenshot). Users have several options for setting the background image: it can be a previously prepared image file, or a "Google Maps" image retrieved by address (e.g., "7510 Hazeltine Ave, Van Nuys, CA 91405") or by geographic coordinates (e.g., "34.20695157310508, -118.44094686571454"). It's important to ensure that the final map image includes the entire fiber path you intend to monitor. When using "Google Maps," we recommend selecting the "roadmap" option because the resulting image has a pale, light appearance that helps draw attention to the colors of the links and icons, rather than the background itself. However, sometimes you may want to use the "satellite" or "hybrid" option.



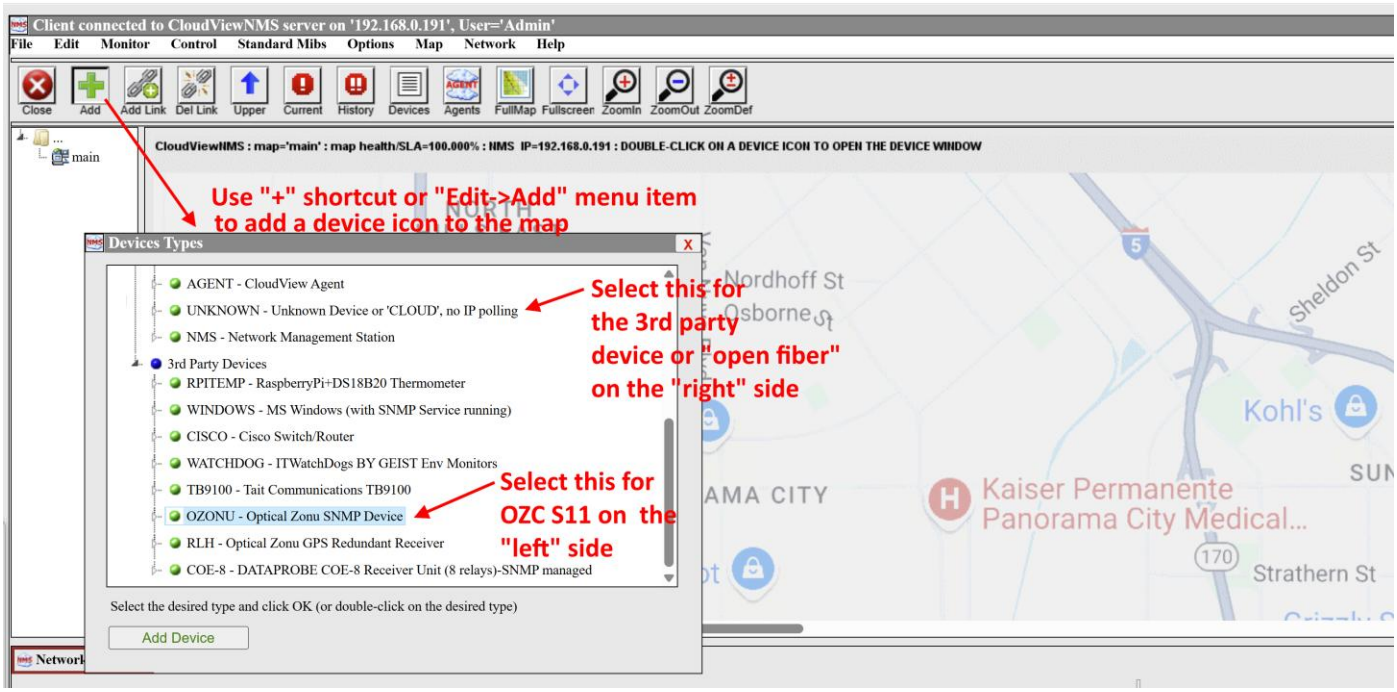
It's important to note that the retrieved background image is scaled using scale=2, meaning its actual dimensions are not 640×640 pixels, but 1280×1280 pixels. You can find this image at:

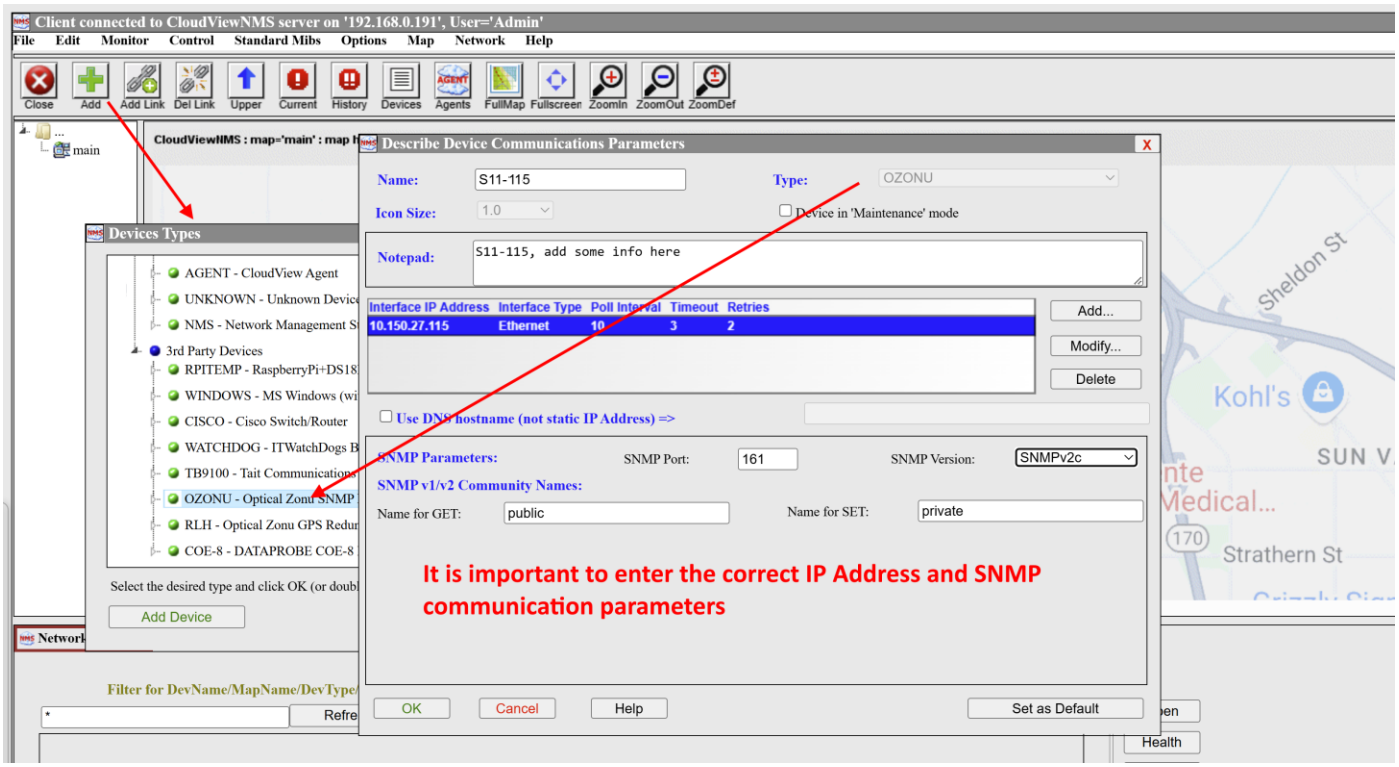
```
<cloudviewnms_root_dir>/data/bitmaps/b_<map_name>.png
```

The image is static, so you can edit it graphically—for example, by adding important notes or marking specific points. However, be sure not to change the file name.

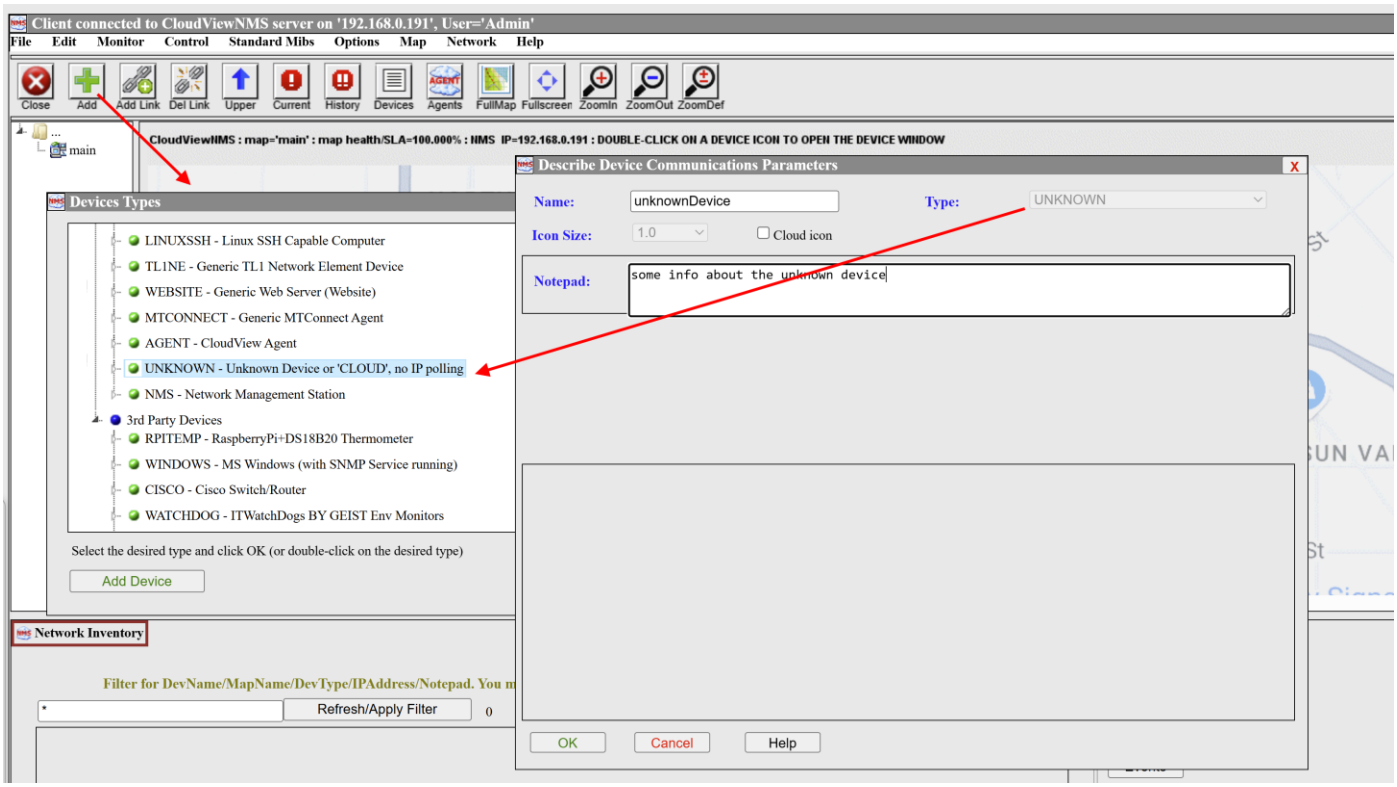
3.4 Adding Two Devices to the Map as Fiber Endpoints

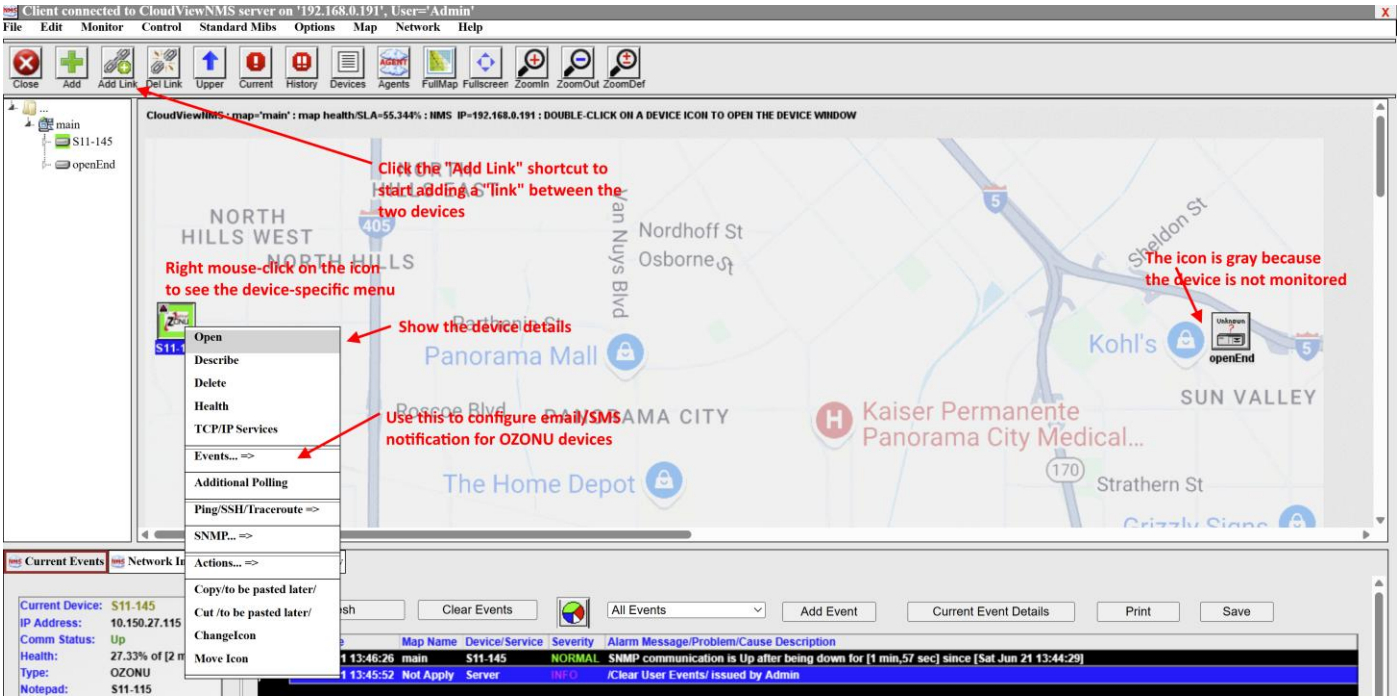
Let's now add two device icons to the map. These devices will represent the two ends of a fiber link. For simplicity, we'll assume the "left" side is Optical Zonu's S11 with an SFP OTDR installed, and the "right" side is an open, unlinked fiber representing a dark fiber scenario. Use the "+" shortcut or **Main Menu → Edit → Add** to add the icons. Be sure to enter the correct SNMP connection parameters for the S11 "OZONU" device—its icon will turn green on the map immediately (see the screenshots below).





For the "right" side—which is either a third-party device or simply the open end of the fiber (unlinked **dark fiber**)—we use the CloudView NMS **"UNKNOWN**" device type.



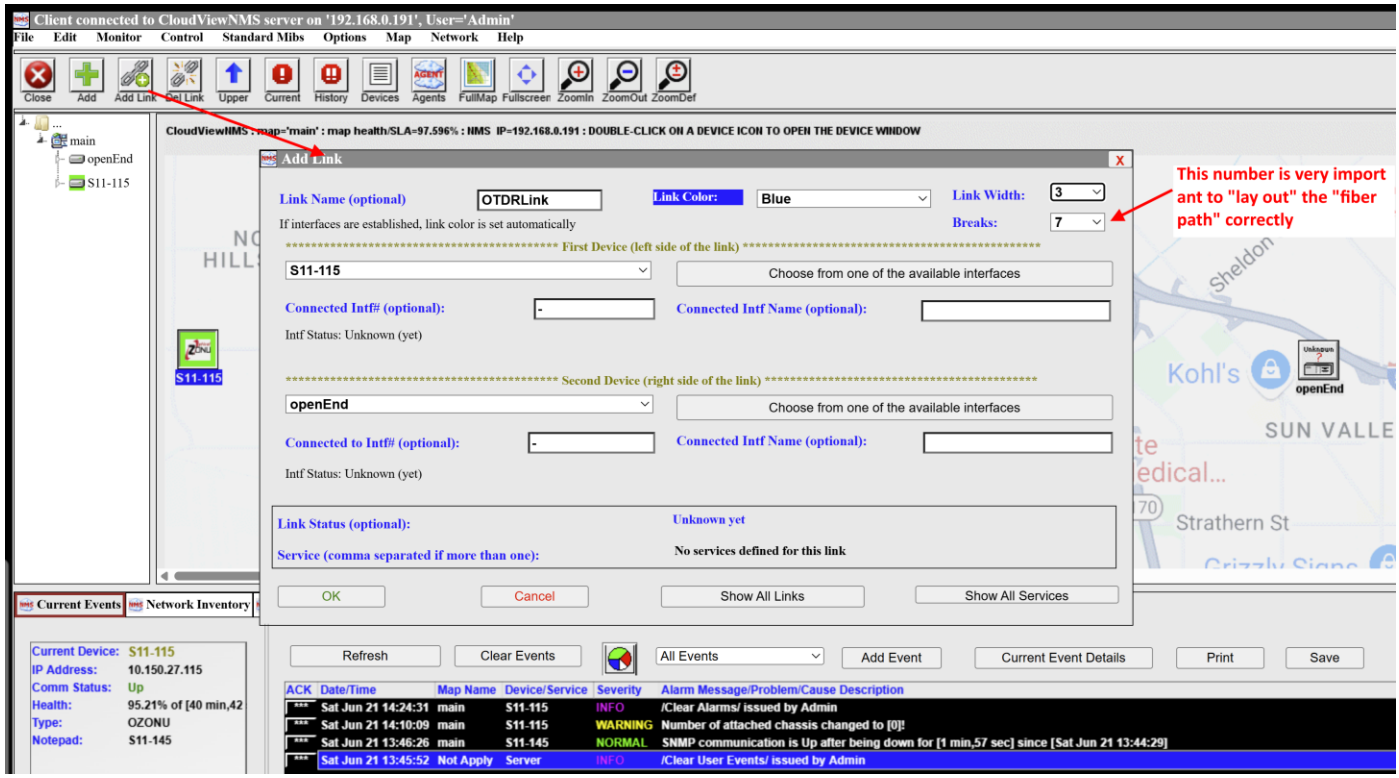


The screenshot above shows the result after both devices have been added to the map. Please note the following:

1. The **S11-115** OZONU device (on the left) appears green, indicating successful SNMP communication. The corresponding event is displayed in the "Events Log." The **openEnd** UNKNOWN device (on the right) appears gray because it is not being polled, and its status is unknown.
2. Right-clicking on the S11-115 device brings up a device-specific pop-up menu. It includes the "Open" option, which provides access to the Optical Zonu device's management GUI. This interface is feature-rich, but a detailed description is beyond the scope of this document.
3. The "Events" option in the pop-up menu can also be used to configure email/SMS notifications for OZONU-type devices, as discussed earlier in this document.

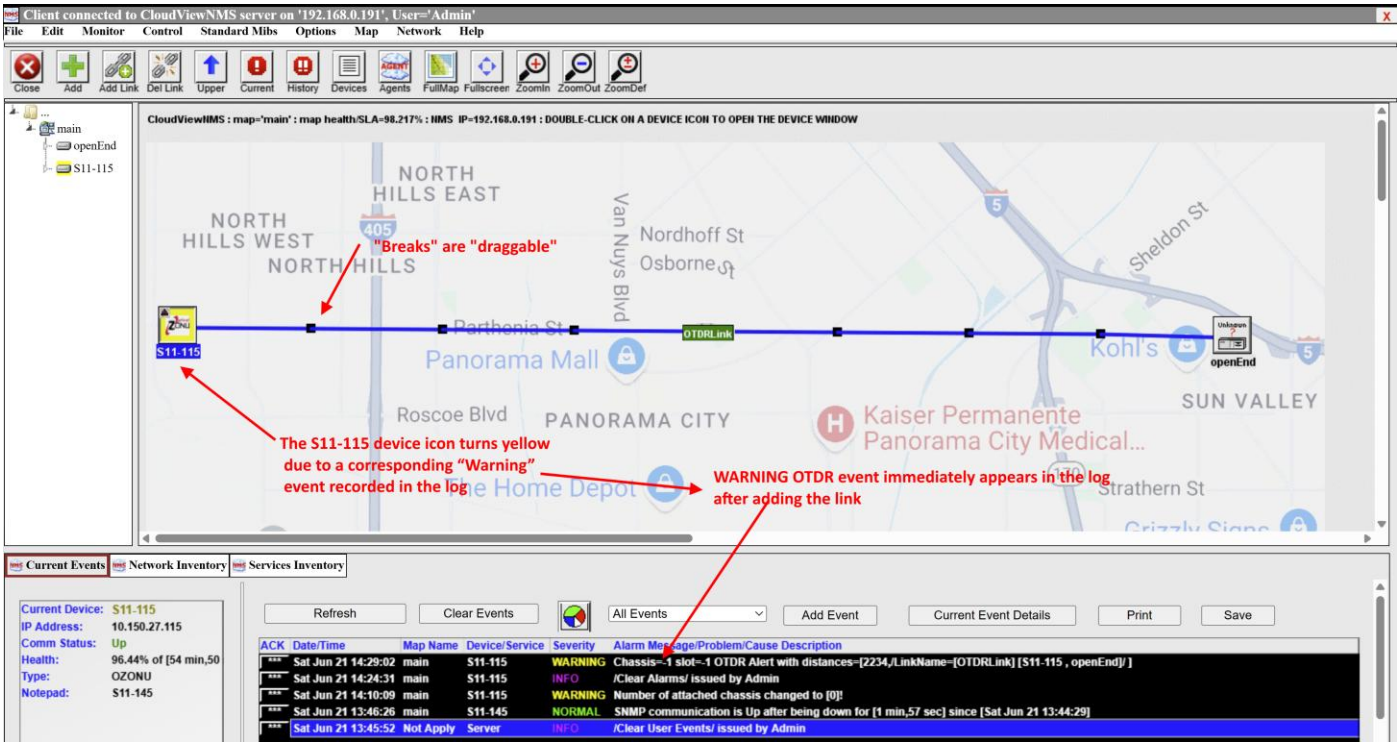
3.5 Creating a Link Between Two Devices (Fiber Link Line)

We are now ready to add a "link" tine to connect the two devices. Use "Add Link" shortcut, see the screenshot below.



Set a clear and easily recognizable **Link Name** to help identify link-related events in the Events Log. Also, ensure that you set the appropriate number of link line "breaks" to accurately represent the real-world fiber path on the map. The maximum number of breaks is 13, though you may need fewer. Keep in mind that you might go through several iterations of adding and deleting the link before arriving at the optimal number.

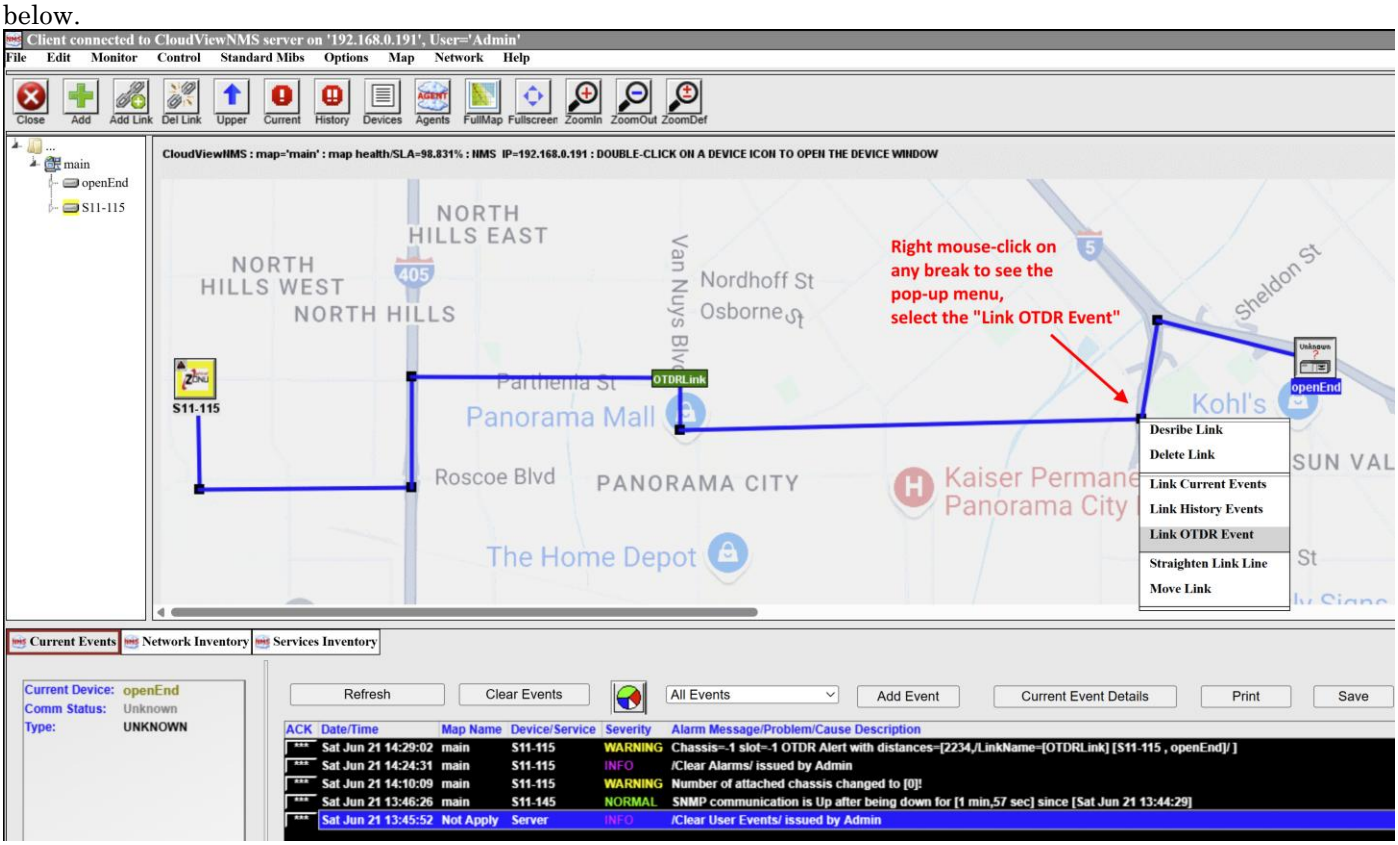
The screenshot below shows the result after clicking the **OK** button in the **Add Link** screen. Note that a warning OTDR event immediately appears in the log—this occurs because the "right" end is open and there is no link. Since this is considered the expected behavior in our scenario, we will adjust it later by setting the reference reflections parameter. S11-115 device icon becomes yellow because of the "yellow" warning event in the log. Additionally, note that the break points on the map are **draggable**; we will use this feature to lay out the fiber path according to the real-life layout.



⚠ **Important:**
If you notice that dragging "break points" or device icons feels sluggish or imprecise, it's likely due to insufficient computing power on the machine running the CloudView NMS server.
Network monitoring is a critical task—it can save you significant time and money when diagnosing and resolving issues. For this reason, we strongly recommend running the server on a high-performance computer, particularly one with robust CPU and RAM resources, right from the start. It's difficult to specify exact CPU or memory requirements, as they vary depending on factors such as polling intervals, the number of devices and fiber links being monitored. However, a good rule of thumb is this: if the web interface feels slow, inadequate server performance is the most probable cause.

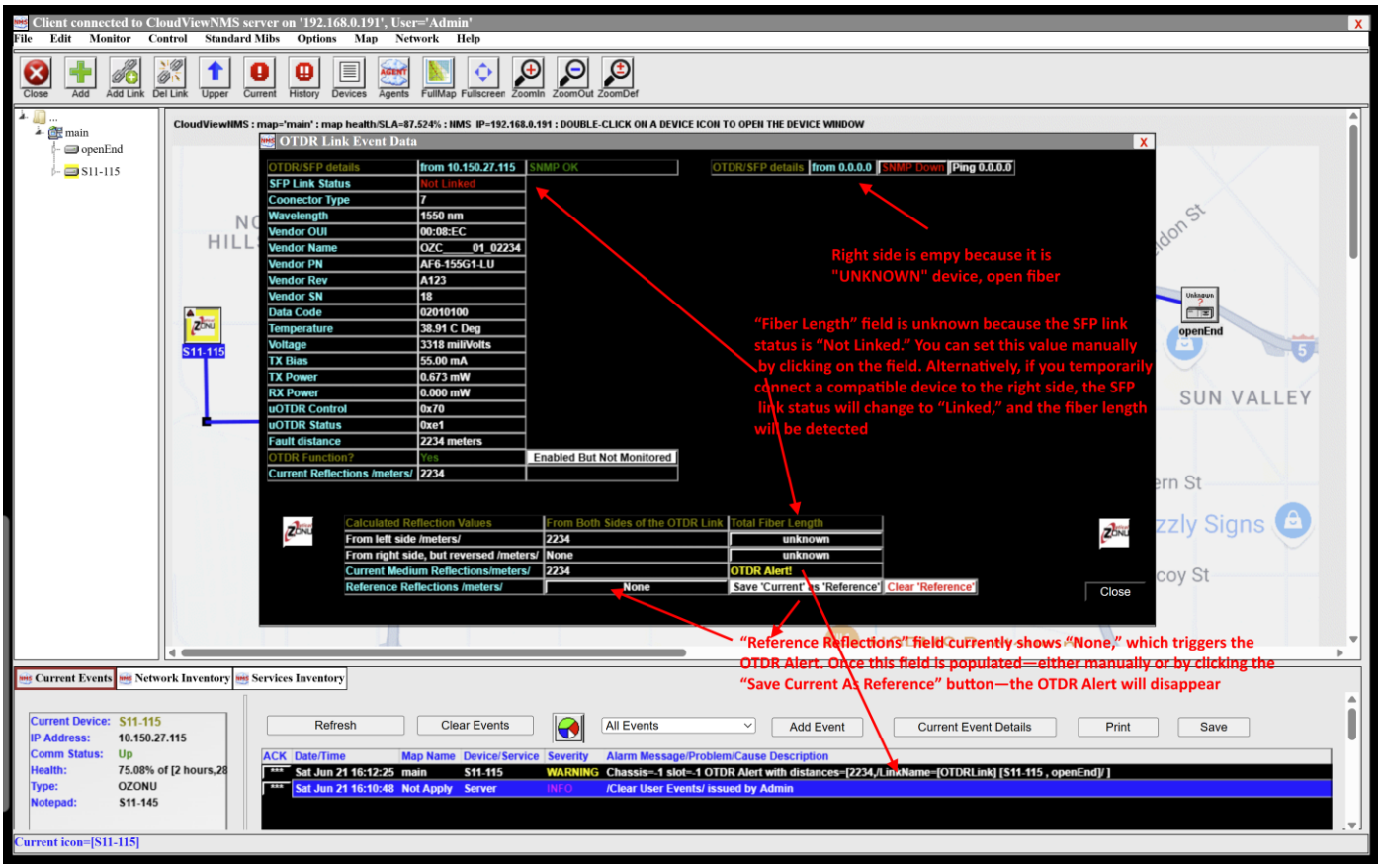
3.6 Accurately Laying Out the Fiber Link Line on the Map

We've added a link to the CloudView NMS map between two device icons, representing fiber endpoints. The link line currently appears as a straight line with several break points. To accurately reflect the real-world fiber path, these break points need to be dragged into their proper positions. While this task may feel tedious, remember—it only needs to be done once during the initial link configuration. Please refer to the screenshot below.



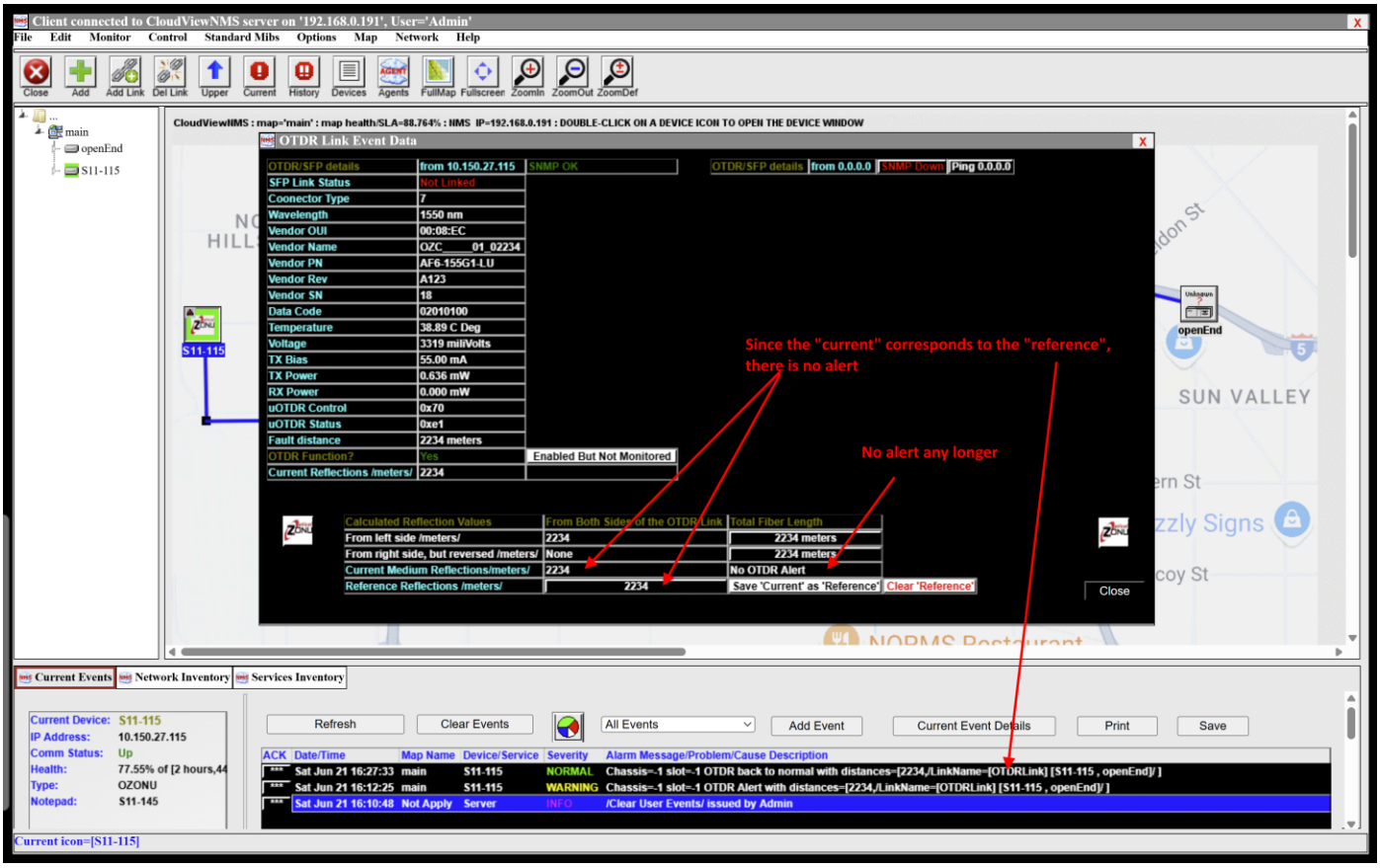
3.7 Using the OTDR Link Event Screen

Right-click on any "break" point to open the link-specific pop-up menu, then select the **"Link OTDR Event"** menu item. Refer to the screenshot below, and let's break down what it shows:



1. The "right" side appears empty because it represents an "UNKNOWN" device—an open, unlinked (dark fiber) endpoint.
2. The "Fiber Length" field is unknown because the SFP link status is "Not Linked." You can set this value manually by clicking on the field. Alternatively, if you temporarily connect a compatible device to the right side, the SFP link status will change to "Linked," and the fiber length will be detected automatically (see the next screenshot).
3. The "Reference Reflections" field currently shows "None," which triggers the OTDR Alert. Once this field is populated—either manually or by clicking the **"Save Current As Reference"** button—the OTDR Alert will disappear (as shown in the next screenshot).

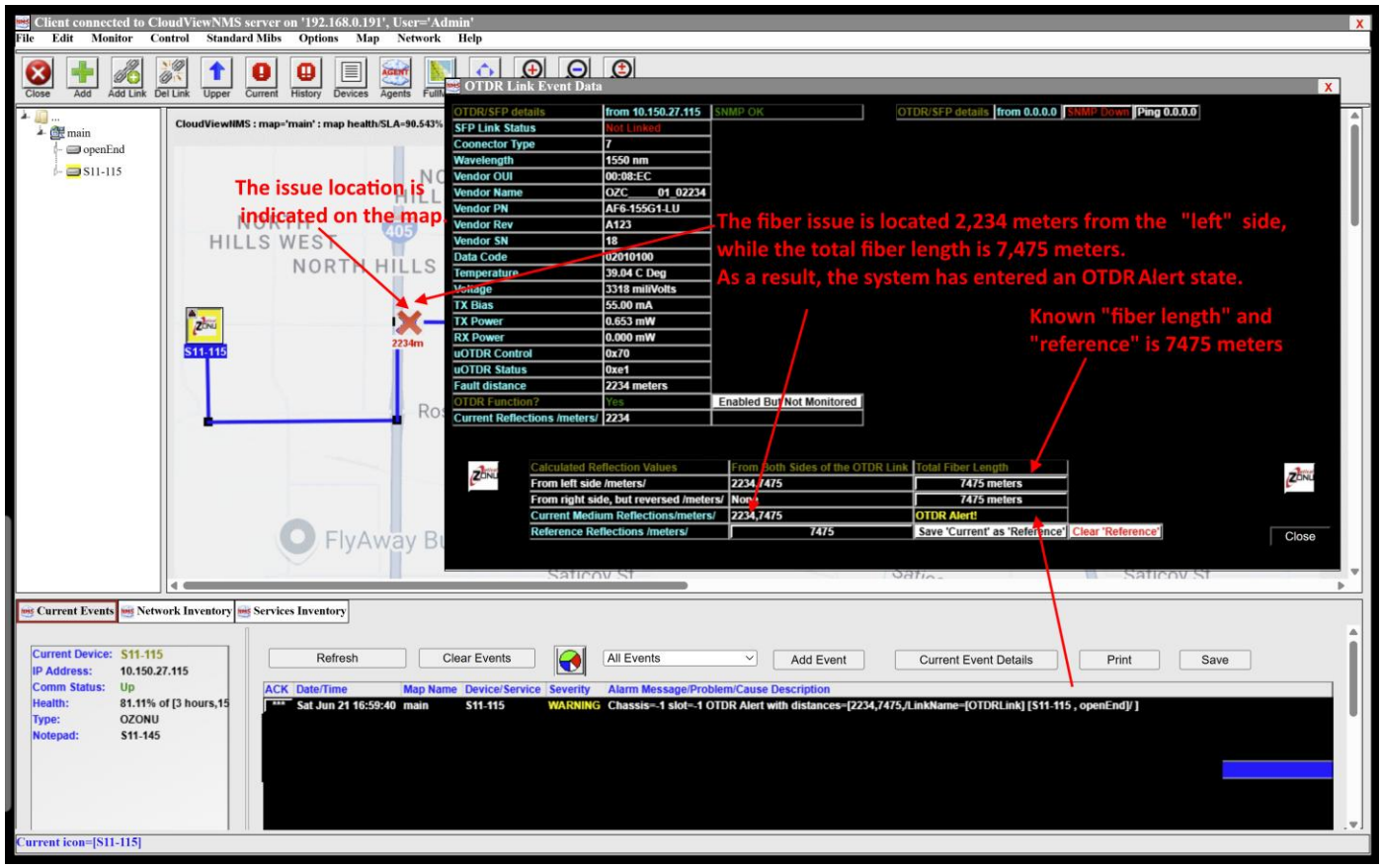
Now, click the **"Save Current As Reference"** button and set the **"Fiber Length"** field. This defines the baseline "normal" state for the link. As a result, a "NORMAL" event is issued, and the previous alert is cleared. You can now close the **OTDR Link Event** screen—24/7 monitoring continues in the background, and you will be notified automatically if the reflection data changes. Refer to the screenshot below.



And now let us see what happens when something "bad" happens with the fiber. For this let us assume that the known fiber length and "reference" are 7,475 meters, but the first fault/reflection distance is less than the "reference" distance. **Important:** If you're closely analyzing the numbers, you'll notice that the fiber length shown here differs from the one discussed earlier. . See the next screenshot.

Note the following:

1. The fiber issue location is indicated on the map.
2. The fiber issue is located 2,234 meters from the “left” side, while the total fiber length is 7,475 meters.
3. As a result, the system has entered an **OTDR Alert** state.



4. Summary

CloudView NMS displays visual and graphical representations of Optical Zonu’s SFP OTDR data and links, which can be overlaid on the management panel. Users can clearly view fiber reflections or faults on the map overlay and receive corresponding alerts 24/7 when the fiber infrastructure is broken or damaged.