Ethernet Link-layer OAM Loopback

How to configure OAM loopback on Anritsu Network Master Pro/Flex with third-party network device

Network Master Pro MT1000A / Network Master Flex MT1100A

Link-layer OAM (802.3ah) is an OAM protocol operating purely at the Ethernet layer without the requirement for setting IP addresses. 802.3ah operates only on point-to-point links and messages are sent in untagged slow protocol frames called OAM Protocol Data Units (OAMPDUs). OAMPDUs are multicast to a specific multicast address that is link-constrained, meaning OAMPDUs only traverse a single link, and are never forwarded by bridges or switches, even if these do not implement OAM.

The capabilities of the link-layer OAM protocol itself are limited to placing the remote device into loopback mode, setting flags indicating critical events, and querying the configuration of the remote device. Two modes are defined for OAM entities: active or passive. The active-mode device can control the passive-mode device. For example, the active-mode device can send commands (Loopback Control OAMPDU) forcing the passive-mode device into or out of loopback mode.

This note describes how to configure the Network Master Pro/Flex to act as an active OAM device capable of remotely setting a connected passive-mode OAM device into loopback mode. Configuration of the third-party Accedian NID network device is described as well.

Network Master Pro/Flex OAM Setup

Follow the below steps to enable the remote OAM loopback function in the Network Master Pro/Flex.

1. At the SETUP page, go to the OAM 803.3ah tab and select the 802.3ah function. At the Discovery tab set State to On and set Link mode to Active.
2. Go to the OAM status page and verify the **Remote Device** is discovered correctly. The Network Master is now ready to start remote loopback.

3. Press the **Loop** button to start OAM remote loopback. The status window shows the result of the remote loop-up request.

4. Press the **Loop** button again to take the remote device out of loopback mode. The status window shows the result of the remote loop-down request.
Accedian NID - OAM Remote Loopback

Follow the steps below to enable the remote OAM loopback function in Accedian NIDs.

1. Select the **OAM -> Configuration** page, and select the OAM instance for the port at which to configure the loopback function.

   In this example, this is the **client** port.

2. Make sure the **Enable OAM protocol** checkbox is checked and select **Passive mode**.

3. Select the **OAM -> Loopback** page, and select the OAM instance at which to configure the loopback function. In this example, this is the **client** instance (port).

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1 The configuration examples in this document are made via the web interface of the ACCEDIAN NETWORKS EtherNID AEN-1000-GE, running firmware version 4.9.2.1. Similar functions may be found in other NIDs from ACCEDIAN NETWORKS, but with slightly different configuration menus.
4. Make sure the **Remote loopback enable OAM 802.3ah** checkbox is checked. The Accedian NID is now ready to accept remote loopback requests from the Network Master.

5. After receiving and accepting the command to set the interface to loopback mode, the loopback status is reflected at the **OAM -> Loopback** screen...

...and the **client** instance detailed page.
Accedian NID - Loopback using Custom Filters

As described earlier, 802.3ah OAM operates only on point-to-point links. When test equipment and the Accedian NID are at different test points in a routed network, it is impossible to remotely start the loopback function from the Network Master Pro/Flex. However, using the Accedian NID filters and the built-in Custom Loopback function, it is possible configure the Accedian NID to loopback test traffic originating from Network Master Pro/Flex while passing other traffic streams.

Follow the steps below to configure the Accedian NID Custom Loopback function. The first step is to configure a filter to address traffic to loopback. The second step is to configure the loopback function to use this filter.

The following example describes how to configure a filter to loopback streams originating from any Anritsu test set (the MAC address of an Anritsu source). In this example, only Layer 2 is filtered. Depending on the network configuration, more advanced filters are available for specifying VLAN/IPv4/UDP/TCP properties of the looped-back traffic.

1. We want to set a filter to address all traffic originating from an Anritsu test set, i.e. with an Anritsu source MAC address of 00:00:91:xx:xx:xx (Anritsu Corporation registered and default instrument addresses).

Select the Traffic -> Filters -> L2 filters page, and select the filter instance to configure.

In this example we are setting up the AnritsuMac filter.

2. Enable MAC source/mask and set a source MAC address of 00:00:91:xx:xx:xx. Set 24 bit mask to look only at the first 3 bytes and ignore the last 3 bytes.

3. Select the OAM -> Loopback page, and select the port at which the loopback function is to be configured. In this example, the client instance (port) is set.
4. Put a checkmark in the Loopback enable checkbox and select Custom at Type. Select L2 filter at Filter type and select AnritsuMAC from the list of available L2 filters.

If applicable, also enable swapping of MAC/IP addresses, and TCP/UDP ports.

The Client port of the Accedian NID will now loopback all traffic originating from an Anritsu test set with source MAC address of 00:00:91:xx:xx:xx.

5. After enabling custom loopback, the loopback status is reflected at the OAM -> Loopback screen.

Note:
As mentioned previously, many more filter properties can be used to uniquely identify the traffic to loop-back. This is the configuration page for an IPv4-type filter which, in addition to VLAN parameters, includes parameters for IPv4 source and destination addresses, DSCP/IP precedence and other IP header fields, UDP/TCP source and destination ports.

Conclusion
Controlling and creating a loopback via OAM 802.3ah across a non-rerouted network or implementing custom filters on devices such as the Accedian NID simplifies testing for telecom engineers. Combining these functions with the flexibility and powerful Ethernet testing capabilities of the Network Master Pro/Flex, allows engineers to troubleshoot any issues quickly.