METRObility optical systems
Simply Brilliant Optical Ethernet

Loopback Testing

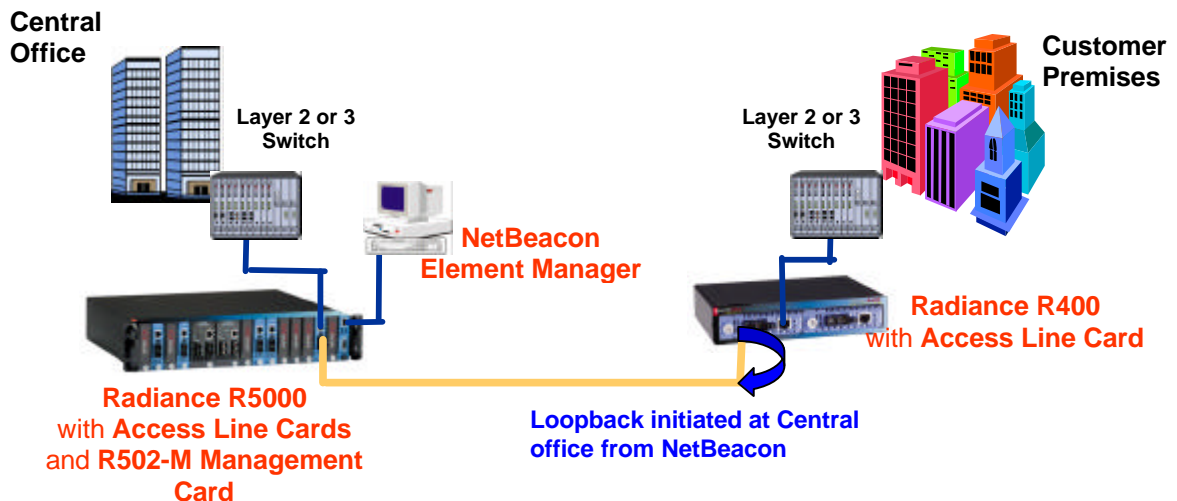## The Problem: Long service response time = Customer Unhappiness

In order to troubleshoot an optical link, service providers usually have to send a service technician to the customer site to identify problems. This not only lengthens the response time required to resolve the customer problem but also increases the cost of service borne by the service provider. Moreover, the service provider may actually lose revenue during the downtime.

The Solution: Remotely initiated loopback testing to troubleshoot a link without a truck roll

In the traditional voice (TDM) network, there are some very standard techniques that provide carriers with troubleshooting and testing capability. Loopback testing is one example. Service providers want to troubleshoot the high-speed copper link, such as a T1 line, without sending someone out into the field. So, one of the important capabilities in a T1/E1 CSU/DSU allows service provider to initiate a remote loopback. Traffic is sent down that T1/E1 copper link and then read back at the central office to see if there are any errors or problems without sending a service technician to the customer site.

Metrobility's Radiance technology provides the same capability for both the optical fiber or copper link. The service provider can, with a simple point and click, initiate a loopback on a particular link from the central office or POP, and remotely troubleshoot the line by utilizing a bit error rate test (BERT) or a packet generator test to monitor specific patterns that may cause trouble.

Typical configuration of Radiance products required for loopback testing

Central Office

Layer 2 or 3 Switch

NetBeacon Element Manager

Radiance R5000
with **Access Line Cards**
and **R502-M Management Card**

Loopback initiated at Central office from NetBeacon

Customer Premises

Layer 2 or 3 Switch

Radiance R400
with **Access Line Card**

Access Line Cards

When loopback is disabled, the traffic through the port is sent to the destination. When remote loopback is enabled, the port returns the incoming traffic back to the sender, while continuing to receive and send management packets. Management packets are not looped back to the sender.

Copper port

Fiber port

**Central Office**   **Remote Site**
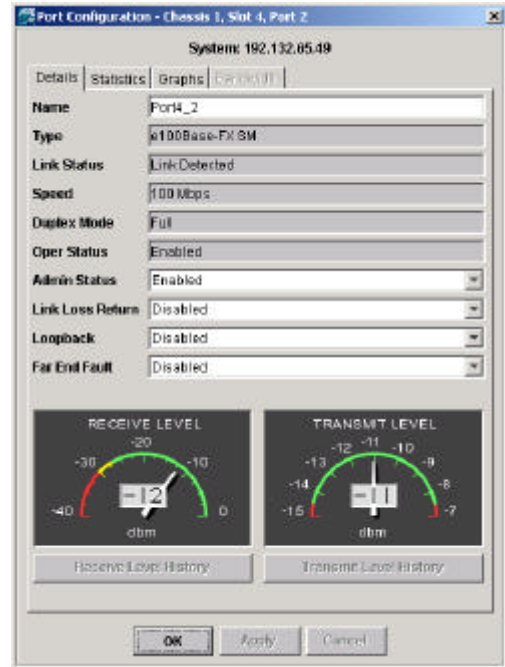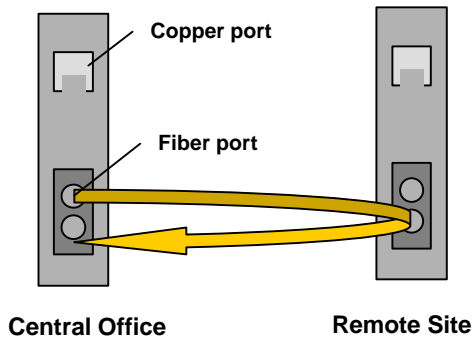
Local and Remote Loopback on T1/E1 Line Cards

There are two forms of loopback for T1 and E1 interfaces: **local** and **remote**.

Remote loopback tests traffic from fiber port at the central office to the fiber port at a remote site. This is similar to the loopback testing for Access Line Cards except that it utilizes the FTL protocol rather than Ethernet.

Copper port

Fiber port

Central Office   **Remote Site**
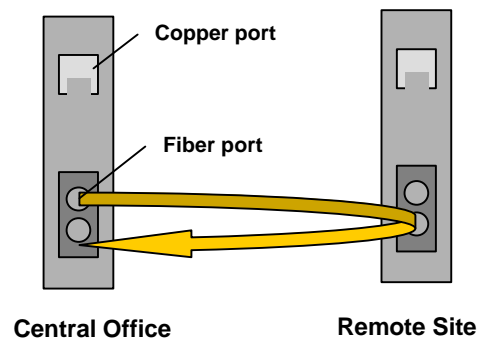
Local loopback can be initiated on the copper link for all T1/E1 line cards to test the link between the device and service provider's internal network.

Internal network

Copper port

Fiber port

Central Office
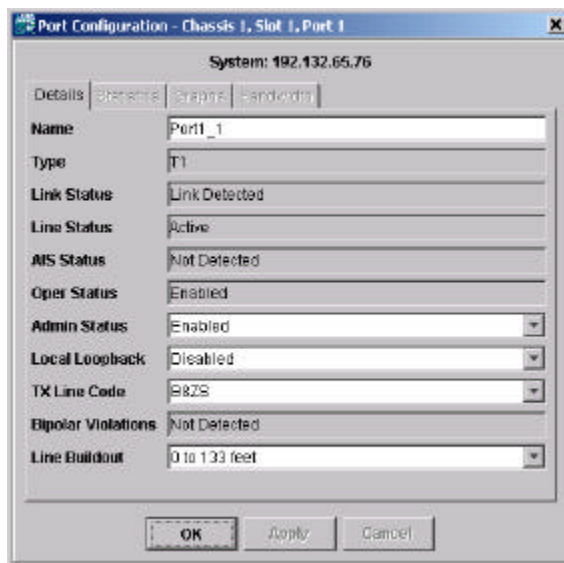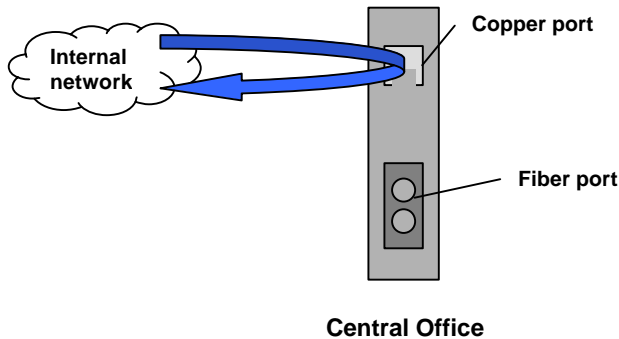
Set up screen for Port 1 (copper) on a T1 line card.
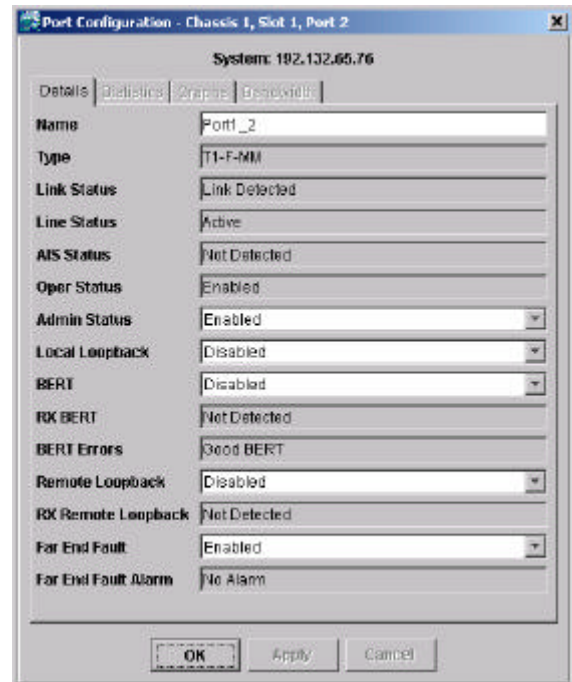
Set up screen for Port 2 (fiber) on a T1 line card.

The Benefit: Save time and money = Happy Customers

Remotely controlled loopback testing can be used to prevent unnecessary truck rolls to the customer site to service a problem that may be identified locally. This results in lower service costs, faster resolution of network problems, greater customer satisfaction, and continued revenue for the service provider.

Product Information

Loopback features are available in the following Metrobility 100Mbps optical Ethernet Access line cards and T1/E1 interface line cards. These products also provide copper-to-fiber and fiber-to-fiber media conversion as well as distance extension from 2km segments to 100km segments. Access Line Cards also offer remote optical amplitude monitoring, quality of line monitoring, and bandwidth provisioning in 1Mbps increments.

Access Line Cards (remote loopback only)

R231-13	100M TX to FX MM/SC
R231-14	100M TX to FX SM/SC
R231-15	100M TX to FX MM/ST
R231-16	100M TX to FX SM/ST
R231-17	100M TX to FX SM/SC LH (40km)
R231-1J	100M TX to FX SM/SC ELH (100km)

Interface Line Cards (remote and local loopback)

T1	E1	
R105-13	R165-13	RJ-45 to Fiber MM-SC
R105-14	R165-14	RJ-45 to Fiber SM-SC
R105-15	R165-15	RJ-45 to Fiber MM-ST
R105-16	R165-16	RJ-45 to Fiber SM-ST
R105-17	R165-17	RJ-45 to Fiber LH/SM-SC (40kkm)
R105-1j	R164-1J	RJ-45 to Fiber ELH/SM-SC (100km)

Chassis Configurations

R5000-17HS	17 Slot Chassis with Two Bays for Optional AC and/or DC Load-Sharing Power
R1000-AAF	2 Slot Chassis with Two Fixed, Load-Sharing, Front Facing AC Power Supplies
R1000-AAR	2 Slot Chassis with Two Fixed, Load-Sharing, Rear Facing AC Power Supplies
R1000-ADF	2 Slot Chassis with One Each Fixed, Load-Sharing, Front AC and DC Power Supplies
R1000-ADR	2 Slot Chassis with One Each Fixed, Load-Sharing, Rear AC and DC Power Supplies
R1000-DDF	2 Slot Chassis with Two Fixed, Load-Sharing, Front Facing DC Power Supplies
R1000-DDR	2 Slot Chassis with Two Fixed, Load-Sharing, Rear Facing DC Power Supplies
R400-02HS-1A	2 Slot Chassis with One External AC Power Supply, Standalone

NetBeacon Element Manager 3.0.0 is required for Access Line Cards. All T1 and E1 interface line cards are supported in NetBeacon 3.1.0. NetBeacon's database option requires NetBeacon 3.0.1 and an R502-M management card.

For additional information loopback testing, NetBeacon and supported modules and line cards, contact Metrobility Optical Systems at 1.877.526.2278 or 1.603.880.1833, or visit us at www.metrobility.com.