METRObility optical systems

Simply Brilliant Optical Ethernet

Line Protection and Restoration

Patented Optical Ethernet Redundant Paths for Ethernet, Fast Ethernet, and Gigabit Ethernet

Interface Line Cards
Copper to Dual Fiber
(100Mbps requires two slots)

Copper to Dual Copper
(on left - single slot)

Standalone Models

- *Dynamic Recovery Mode for 6.72 microseconds failover @100Mbps*
- *Network Select Mode for backup and maintenance*
- *SONAR: Switch on absence of traffic*
- *Extended distances up to 100km*
- *Copper-to-dual copper; Copper-to-dual fiber; Fiber-to-dual fiber*
- *Frame Size Transparent*

Ensuring High Availability

Metrobility's patented dual port interface line cards and standalone units offer redundant data paths for line protection and restoration (LPR) to prevent data loss due to cable failure, port failure, or catastrophic switch failures. Redundant links offer unique advantages for mission-critical networks over legacy fault tolerant approaches for time sensitive applications which require a higher level of security and alarm notification.

This physical layer solution is able to isolate failures with a faster recovery time and is simpler to implement when compared to using Spanning Tree protocols.

Metrobility's Patented Redundant Technology

Metrobility's patented line protection and restoration technology ensures a quick recovery from a physical layer failure. The LPR technology converges quickly to minimize packet loss. The low packet frame loss is a maximum loss of 1-2 packets (measured with minimum packet size and minimum inter-packet gap) during a failover transmission.

The "redundant twister"™ has two operational modes to preserve network availability—Dynamic Recovery Mode or Network Select Mode.

Automatic traffic re-routing

When configured in Dynamic Recovery Mode, link failure is automatically detected and traffic is immediately rerouted to a secondary path or switch. This instantaneous path restoration is ideal for critical areas that require a high degree of fault tolerance.

Optional manual traffic re-routing

Network Select Mode enables the administrator to manually redirect traffic to a secondary data path, in order to perform maintenance on the first path, for example. Both options ensure that network downtime does not affect users.

Innovative Traffic Monitoring for Re-Routing

SONAR (Switch on No Activity Received), available on select models, offers an even higher level of protection. By sensing not only link but also the loss of data traffic, Metrobility's SONAR-enabled LPR devices ensures reliability in the event of an upstream switch failure.

Exceptional SNMP Management

Network administrators can also maximize network uptime through proactive management. Metrobility's NetBeacon® element management system provides end-to-end visibility of all Metrobility chassis-based network components and the ability to initiate active control through sophisticated SNMP-based management tools.

Connectivity Options

Metrobility's LPR solutions support 10, 100 and 1000Mbps networks. Extended distances up to 100km (100 and 1000Mbps only) may be achieved through 1550nm singlemode fiber connections.

User-configurable Gigabit Ethernet Optics

The GigE LPR line card utilizes pluggable optics which may be easily replaced as network requirements change. Choose from small form factor (SFP) multimode or singlemode options.

The Metrobility® Difference

Fast failover (6.72 microseconds over 100Mbps) ensures low packet loss

Full signal retiming, regeneration and reamplification allows for maximum segment length

Unique dual port interface line cards provide data link redundancy to meet critical network uptime requirements

Complete range of fiber optic connector types provide network design flexibility

Best-of-Class SNMP management

NEBS Level 3 compliant

Product Highlights

Interoperates with half-duplex or full-duplex mode devices

Strict standard compliance ensures compatibility with other vendors' equipment for flexible connectivity

SONAR - Switch on No Activity Received option available on select models

Managed Network-on-Demand

Metrobility's Line Protection and Restoration (LPR) solutions deliver Managed Network-on-Demand capability for mission-critical applications. An essential connectivity tool for high priority and mission-critical applications, it provides fully redundant data paths, as well as power supply redundancy, for Ethernet, Fast Ethernet or Gigabit Ethernet devices. If the primary connection fails due to a cable or hardware failure, the "redundant twister" interface switches the device's traffic to the secondary connections within 6.72 microseconds at 100Mbps.

Managed Network-on-Demand allows the "redundant twister" media converter to be configured to operate in either Dynamic Recovery Mode (DRM) to ensure session integrity and increase uptime, or in Network Select Mode (NSM) to redirect traffic and add security through link isolation.

For areas in the network that don't require redundancy, the module port can be set for Network Select Mode to provide flexibility and security through link isolation. Network Select Mode redirects traffic from one link to another at any time through user interaction to implement, for example, dedicated networks for backup applications.

Dynamic Recovery Mode

(Automatic traffic re-routing)

- offers a higher level of security
- used in areas that need high fault tolerance
- less downtime if a link or module fails
- non-distruptive link reconnection
- alarm notification
- instantaneous recovery

Network Select Mode

(Manual traffic re-routing)

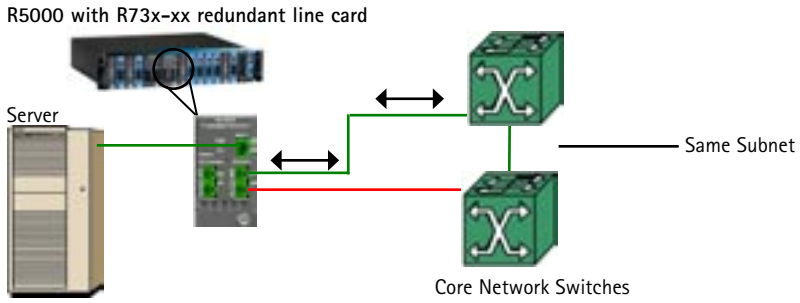
- configures a secondary fiber port
- redirects traffic from primary link to secondary link
- use for networks with dedicated backup application
- provides security through link isolation
- alarm notification

SONAR

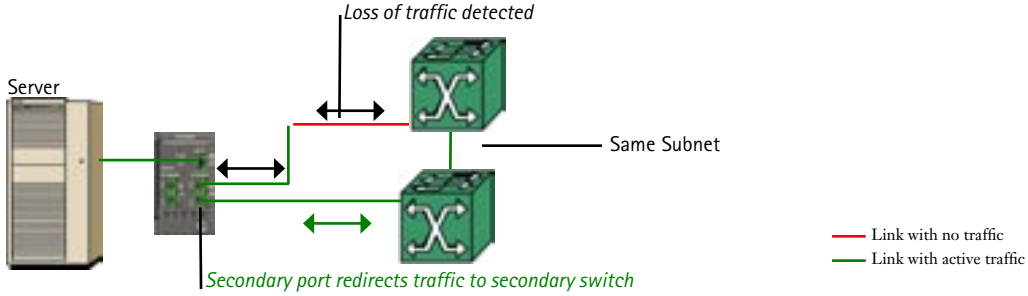
SONAR, or Switch on No Activity Received, not only monitors for loss of link on the active port, but will also monitor for traffic. With SONAR enabled, the line card monitors the active port for loss of data activity, in addition to loss of a valid link. SONAR enables the card to automatically change the active port to its backup when the following two conditions occur:

- No data activity is detected on the active port for a configurable period of time (2-4 seconds).
- Data activity is detected on the backup port.

Working Network - Traffic from Primary Switch

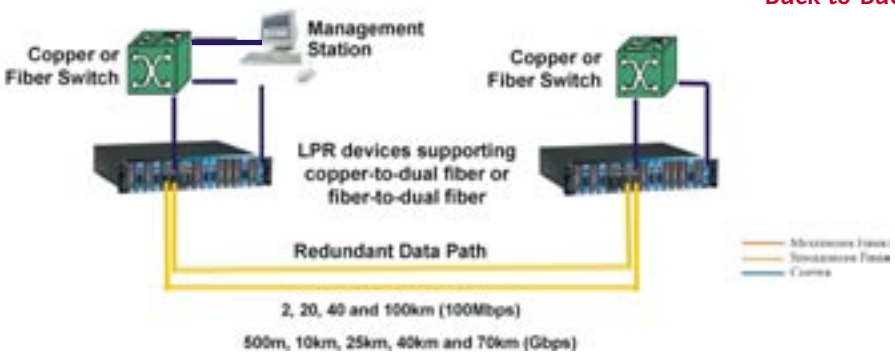


SONAR Senses Primary Switch Failure - Traffic Redirected to Secondary Switch



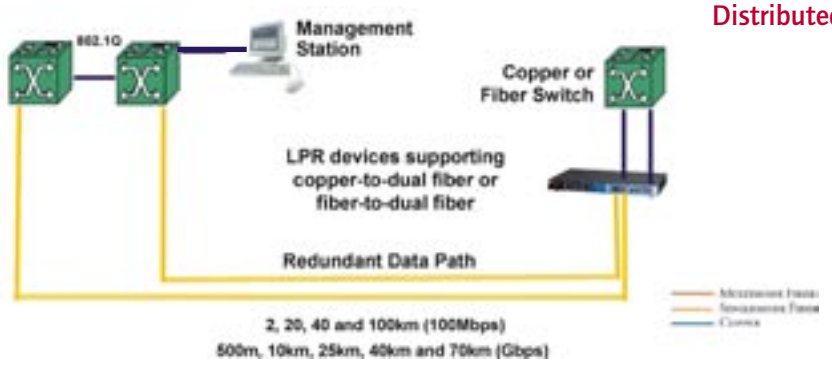
Applications

Back-to-Back Application



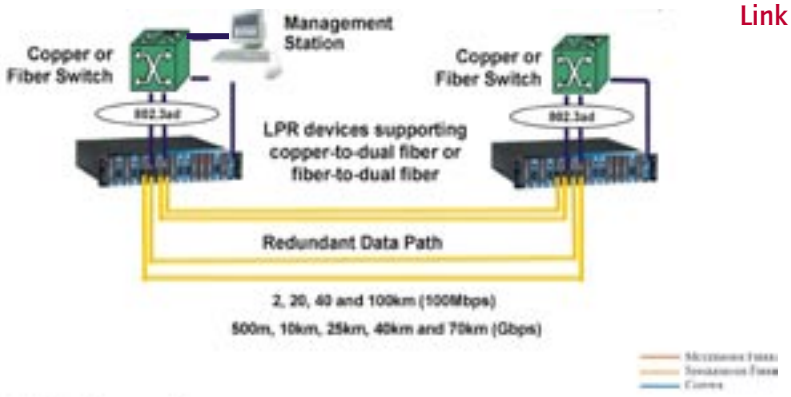
A typical application of the LPR is to use them in pairs to extend a network's reach between two remote devices. In the back-to-back setup, both primary ports are linked to each other and both secondary ports are linked to each other as shown in the figure above.

Distributed Application



The distributed LPR application in the figure above is a point to multipoint configuration which ensures high availability by protecting against both a switch failure and an optical path failure.

Link Aggregation



IEEE802.3ad=Link Aggregation

The Link Aggregation Protocol as defined by 802.3ad is a point to point mechanism that can provide both load balancing and link redundancy. The Link Aggregation Protocol is transparently transmitted through Metrobility's LPR offerings allowing for optical path protection while ensuring full bandwidth availability.

Line Protection and Restoration Options:

Line Card	Standalone	Port 1	Port 2	Max. Supported Segment Length Port 1	Port 2
10Mbps					
	2711-11	10BASE-T RJ-45	10BASE-T (2) RJ-45	100m	100m
R712-11		10BASE-T RJ-45	10BASE-T (2) RJ-45 with SONAR	100m	100m
100Mbps[1]					
	2731-11	100BASE-T RJ-45	100BASE-T (2) RJ-45	100m	100m
R731-13	2731-13	100BASE-TX RJ-45	100BASE-FX (2) multimode SC	100m	2km
R731-14	2731-14	100BASE-TX RJ-45	100BASE-FX (2) singlemode SC	100m	20km
R731-15	2731-15	100BASE-TX RJ-45	100BASE-FX (2) multimode ST	100m	2km
R731-16	2731-16	100BASE-TX RJ-45	100BASE-FX (2) singlemode ST	100m	20km
R731-17	2731-17	100BASE-TX RJ-45	100BASE-FX (2) singlemode SC	100m	40km
R731-1J	2731-1J	100BASE-TX RJ-45	100BASE-FX (2) singlemode SC	100m	100km
100Mbps with SONAR[1]					
R732-11		100BASE-TX RJ-45	100BASE-TX (2) RJ-45 with SONAR	100m	100m
R732-13		100BASE-TX RJ-45	100BASE-FX (2) multimode SC with SONAR	100m	2km
R732-14		100BASE-TX RJ-45	100BASE-FX (2) singlemode SC with SONAR	100m	20km
R732-15		100BASE-TX RJ-45	100BASE-FX (2) multimode ST with SONAR	100m	2km
R732-16		100BASE-TX RJ-45	100BASE-FX (2) singlemode ST with SONAR	100m	20km
R732-17		100BASE-TX RJ-45	100BASE-FX (2) singlemode SC with SONAR	100m	40km
R732-1J		100BASE-TX RJ-45	100BASE-FX (2) singlemode SC with SONAR	100m	100km
1000Mbps with SONAR (See below for optics)*					
R752-11	2752-11	1000BASE-T RJ-45	1000BASE-T (2) RJ-45 with SONAR	100m	
R752-1S	2752-1S	1000BASE-T RJ-45	1000BASE-X with SONAR (2) see optics below*	100m	
R752-SS	2752-SS	1000BASE-X see optics below	1000BASE-X with SONAR (2) see optics below*		

*SFP Pluggable Optics

Small form-factor pluggable (SFP) fiber optic transceivers are fully compliant with applicable aspects of IEEE 802.3-2002.

O211-M5	1000Base SFP MM (500m)	O211-10	1000Base SFP SM (10km)
O211-25	1000Base SFP SM (25km)	O211-40	1000Base SFP SM (40km)
O211-70	1000Base SFP SM (70km)	O211-1A	1000Base SFP SM (100km)

*SFP Optics, Wavelength-Specific (CWDM)

Use in conjunction with Metrobility's R4000 CWDM Multiplexer and OADM. Supports distances up to 80km.

0411-80-27	SFP LC 1270nm	0411-80-43	SFP LC 1430nm	0411-80-55	SFP LC 1550nm
0411-80-29	SFP LC 1290nm	0411-80-45	SFP LC 1450nm	0411-80-57	SFP LC 1570nm
0411-80-31	SFP LC 1310nm	0411-80-47	SFP LC 1470nm	0411-80-59	SFP LC 1590nm
0411-80-33	SFP LC 1330nm	0411-80-49	SFP LC 1490nm	0411-80-61	SFP LC 1610nm
0411-80-35	SFP LC 1350nm	0411-80-51	SFP LC 1510nm		
0411-80-37	SFP LC 1370nm	0411-80-53	SFP LC 1530nm		

[1] Copper to dual fiber requires 2 slots. Not supported in R1000, R400 or R200.

Specifications

Environmental

Operating Temperature	0°C to 50°C
Operating Humidity	5% - 95%
Storage Temperature	-30°C to 70°C

Standards Compliance

IEEE 802.3, IEEE 802.3u, IEEE 802.3Z, IEEE 802.3ad

Safety and EMC Compliance

UL, CSA, EN60950 (safety), FCC Part 15, Class A, EN55022 Class A (emissions), EN55024: 1998 (immunity), IEC 825-1 Classification, Class 1 Laser Product, DOC Class A (emissions)

Standalone

Dimensions	1.6"H x 5.8"W x 4.3"L 14.6cm x 11.0cm x 4.2cm
Weight	1 lb; .45 kg
Input Power	120-240V AC 50/60Hz; 36-72V DC

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Metrobility Optical Systems is an innovative next generation optical networking company whose focus is on delivering optical access platforms and to harness the power of Ethernet and fiber optics to deliver superior network edge access, connectivity and wavelength multiplexing solutions.

U.S. PATENT No. 6,058,479

Gigabit Models

A6285 ISO 9001

Metrobility Optical Systems,Inc.

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