Vanguard Managed Solutions

Vanguard Applications Ware
IP and LAN Feature Protocols

Token Ring Basics

Notice

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Token Ring Basics Guide

Overview

Introduction

Token Ring is a common implementation of a LAN topology in which stations are connected point-to-point, forming a circle or a ring. A token is a special frame that, passes through the LAN to enable stations to transmit data. A station can send a frame of data along the ring only when it receives the token.

This guide explains how to configure Vanguard ports for Token Ring operations.

In This Manual

Token Ring LAN

Introduction

This section explains how Vanguard products use Token Ring Functionality.

Vanguard Support for Token Ring

Vanguard Token Ring LAN functionality complies with the IEEE 802.5 specifications and provides Source Route Bridging to transport many different protocols over the Wide Area Network (WAN) to a remote destination. Some of the supported protocols include:

- Novell NetWare
- SDLC Cluster Controller
- IBM PC LAN
- NetBIOS
- IBM 3270 Emulation 3.0
- IBM APPC

See the IEEE 802.5 specification for additional details on Token Ring functionality.

Example of Token Ring Frame Format

Figure 1 shows the basic frame format for the Token Ring frame supported by Vanguard nodes.

802.5/IBM TR Frame Format:

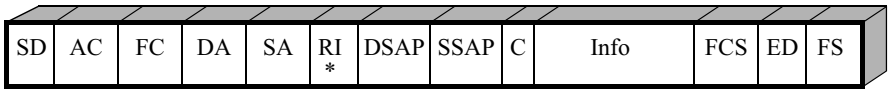

Figure 1. Token Ring Frame Format

Token Ring LAN Bridging Option

The Token Ring LAN bridge option is designed to operate with and take advantage of typical Vanguard networking functions, such as switching and X.25 routing, serial data support, and wide carrier service/topology support.

It adds the transport of Token Ring LAN-based traffic to the protocols already supported by Vanguard products, letting you consolidate LAN and Serial networks using minimum carrier bandwidth facilities.

The Token Ring LAN option supports up to 32 logical bridges, which can be connected to similar bridges in other Vanguard nodes (see Figure 2). These connections can also be switched and routed on a network using virtual circuits rather than simply being connected to the other bridge via a physical connection as in a standard Token Ring bridge.

Example of Token Ring Bridge Connection

Figure 2 shows two Token Ring LANs connected across a WAN by a bridge made up of two Vanguard nodes.

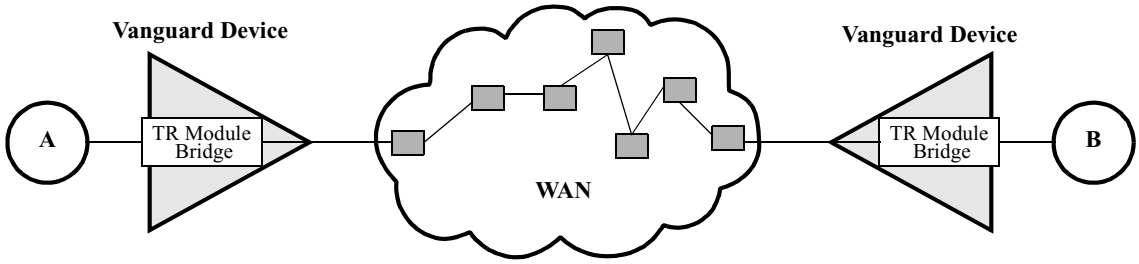

Figure 2. Token Rings Connected Via Bridges

Token Ring LAN Port

Introduction

This section describes the Token Ring Port. Figure 3 shows the location of the Token Ring Port Record and lists the parameters.

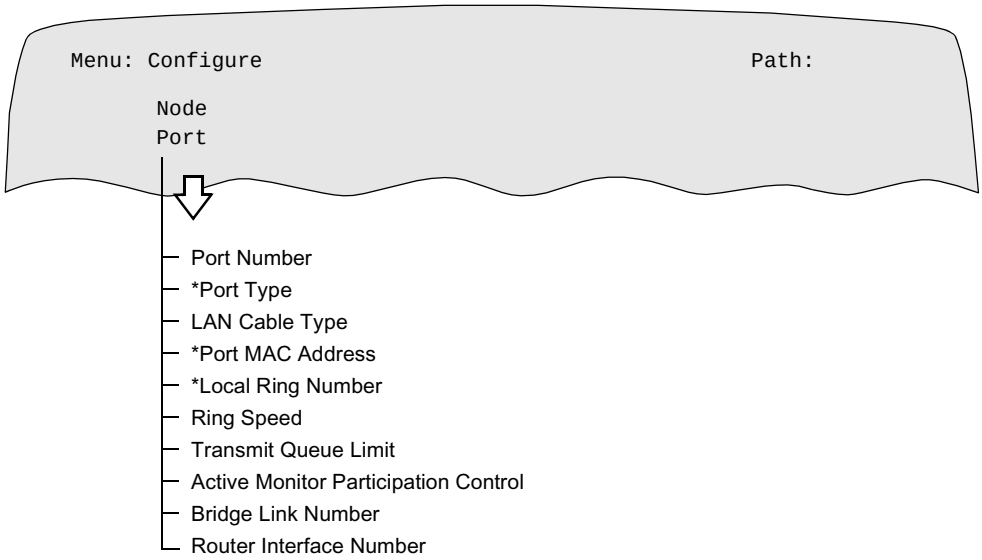

Figure 3. Token Ring Port Menu

Parameters

These parameters make up the Token Ring LAN Port Record.

Note

An asterisk (*) in the parameter name indicates that a node boot is required for changes to take effect.

Port Number

Range:	Dependent on the platform
Default:	1
Description:	Represents the physical port number.

*Port Type

Range:	NULL, TR
Default:	TR
Description:	Specifies the port type: NULL: Reserves the port for future use. TR: The Token Ring (IEEE 802.5) type port.
Boot Type	Node Boot

LAN Cable Type

Range:	UTP, STP
Default:	STP
Description:	Specifies the type of cable and related connector that is used for the LAN interface. • UTP: Unshielded twisted pair. • STP: Shielded twisted pair.

*Port MAC Address

Range:	00-00-00-00-00-00 to FE-FF-FF-FF-FF-FF
Default:	(BIA) (00-00-00-00-00-00, if hardware is absent)
Description:	Specifies the MAC address (Canonical) of the LAN port. This value defaults to a universally administered address which is supplied in the TRIM card PROM. The PROM address is unique to the particular LAN port and is referred to as the Burned In Address (BIA). If the BIA is used as the LAN port MAC address, you must update the node configuration if you replace the node's TRIM card, so that the BIA of the new card becomes the LAN port MAC address stored in configuration memory. This parameter can also be configured to a locally administered MAC address. A value of zero (00-00-00-00-00-00) is used as default when hardware is absent. When hardware is present, if the MAC Address is configured to zero, it is overwritten by the BIA. Any configured MAC Address must have the high order byte set at an even value (Canonical format). There are two forms commonly used for displaying the address: Canonical and non-Canonical. Refer to the section "LAN Control Menu" for more information.

*Local Ring Number

Range:	0001 to 0FFF (hex)
Default:	0001
Description:	Specifies the local Token Ring number attached to this port. This setting is used as a default if the value is not obtained from Ring Parameter Server (RPS), which is one of the servers in the LAN Server Subsystem.

Ring Speed

Range:	4Mbps, 16Mbps
Default:	4Mbps
Description:	Specifies the Token Ring LAN speed in Mbps.

Transmit Queue Limit

Range:	20 to 500
Default:	50
Description:	Specifies the number of frames that can be queued for transmission to the LAN before any frame is dropped.

Active Monitor Participation Control

Range:	ENABLE, DISABLE
Default:	ENABLE
Description:	Controls whether the port participates in the active monitor selection process. When set to Disable, this parameter has no effect under these two cases: • The TR-Port is the only Ring Station on the Ring. • The TR-Port is the Ring Station that detects the need for initiating the selection process. In both of these cases, the TR-Port behaves as if this parameter were set to ENABLE.

Bridge Link Number

Range:	1 to 4
Default:	1
Description:	Specifies the bridge link number associated with this LAN port. The corresponding bridge link record must be configured under bridge configuration menu.

Router Link Number

Range:	1 to 4
Default:	1
Description:	Specifies the router interface number associated with this LAN port.

Token Ring Detailed LAN Statistics

Introduction

When you select Detailed LAN Port Statistics, a screen appears containing information about LAN Ports.

This section describes the statistics available for an Ethernet LAN connection.

What You See in This Screen

Figure 4 shows an example of the Token Ring Detailed LAN Port Statistics screen.

```
Detailed LAN Port Statistics: Port 501                    Page:  1 of  3
Port Number:    501         Port Type:      TR      Port Status:  ENABLE
Ring Speed:     4 Mbps      Local Ring #:   1       Ring State:   opened
Bridge Link Number:   2     Router Interface Number:   2
Port Address:   10:00:7C:D8:9A:27   NAUN Address:   00:06:CF:A0:13:2E
Functional Address Mask: 0000001A   Ring Open Status:     open
Ring Status:      No Problem
                            Last Stats Reset: 13-MAY-2002 14:50:44
Physical Summary:
 Burst Errors:      0          Line  Errors: 0          AC Errors:    0
 Frame Copy Err:    0          Lost Frames:  0          Token Errors: 0
 Transmit Beac:     0          Soft Errors:  0          Hard Errors:  0
 Lobe Wires Disc:   0          Signal Loss:  0          Singles:      0
 Recoveries:        0          Removes:      0          Short Frames: 0
 Frm Size Exceeded: 0          TX Discards:  10         RX Congest:   0

Data Summary:         RX          TX
       Bytes          460         4103657716
       Frames         6           139977082
       Avg Frame Len  0           60
       FPS            0           2143
 Press any key to continue ( ESC to exit ) ...
```

Figure 4. Detailed LAN Port Statistics

Description of Terms

The Detailed LAN Port Statistics screen contains the following information:

Screen Term	*Description*
Port Number	Number of the port displaying statistics.
Port Type	TR: Configured Value of the Port type.
Port Status	Can be either Enable or Disable depending upon the Port Control command.
Ring Speed	Configured value of the Ring Speed.
Local Ring #	Ring Number as determined during the ring attachment; Configured value if not determined during the attachment; (Blank) if not configured or it cannot be determined.

Screen Term	***Description*** *(continued)*
Ring State	The current interface state with respect to entering or leaving the ring. The possible states are: • Opened: Port is enabled and insertion onto the ring is successful. • Closed: Port is disabled and it is deinserted from the ring. • Opening: Port is enabled and insertion onto the ring is in progress. • Closing: Port is disabled and deinsertion from the ring is in progress. • Open Failure: Open process has failed, the port is deinserted from the ring. • Ring Failure: This value is shown if the current Ring Status indicates a failure.
Port Address	Configured value of the Port MAC Address parameter of the port.
NAUN Address	The MAC Address of the Nearest Active Upstream Neighbor (NAUN). Blank indicates not found (for example, ring status not open). Applies to TR LANs only.
Functional Address Mask	Actual value of the Adapter's Functional Address Mask.
Ring Open Status	• Indicates the success or the reason for failure of this Adapter’s most recent attempt to enter the LAN. The possible states are: • noOpen: Open not attempted (applies if not disabled). • badParam: Node Address, list size, or buffer size error. • lobeFailed: Lobe media test failed. • signalLoss: If the signal loss condition is detected during open process. • insertionTimeout: If the port is unable to logically insert onto the ring before 18 seconds insertion time. • ringFailed: After becoming the Active monitor, the port is unable to receive its own Ring Purge MAC frame. • beaconing: A Beacon MAC frame is received or monitor contention timeout. • duplicateMAC: Another station on the ring has the same port MAC Address. • requestFailed: The RPS is present and does not respond to Request initialization MAC frame. • removeReceived: Remove Adapter MAC frame is received. • open: Last open successful.

Screen Term	***Description*** *(continued)*
Ring Status	Indicates the current status of the TR and the port. This status applies only after a port has been added to the ring successfully. The possible states are: • Ring Open Status = Open: More than one status value can be displayed at a time. • No Problem: Functioning normally. • Ring Recovery: There is claim token MAC frame on the ring. • Single Station: There is no other station on the ring. • Remove Received: Remove ring station MAC frame is received. • Auto Removal Error: Indicates internal hardware error following the beacon auto-removal process, and the port is deinserted. • Lobe Wire Fault: Open or short circuit detected in lobe. • Transmit Beacon: Port is transmitting a beacon. • Soft Error: Indicates that the port has transmitted a report error MAC frame. • Hard Error: Indicates that the port is receiving or transmitting a beacon MAC frame. • Signal Loss: Port has detected a loss of signal on the ring. • (no status): Open not completed.
Last Statistics Reset	Time when the node restarted or the stats were reset by CTP/Manager command.

Screen Term	***Description*** *(continued)*
Physical Summary	• Summary of the following: • Burst Errors: This counter is incremented when the port detects the absence of transition for five half-bit timer interval (burst-five error). • Frame Copy Err: This counter is incremented when the port recognizes a frame addressed to its specific address, but finds the ARI bit set to 1 indicating a line hit or duplicate address. • Transmit Beac: This counter is incremented when this interface has transmitted a beacon frame. • Lobe Wires Disc: This counter is incremented when this interface detects the short or open circuit in the lobe data path. • Recoveries: This counter is incremented when the Claim Token MAC frame is observed on the ring. • Line Errors: This counter is incremented when a code violation exists in a token; or a code violation exists between the start and end delimiters of a frame; or if a FCS error exists. • Lost Frame: This counter is incremented when the port is in transmit (striping) mode and fails to receive the end of the frame it transmitted. • Soft Errors: This counter is incremented when a Report Error MAC frame is transmitted. • Signal Loss: This counter is incremented when this interface has detected the loss of signal condition from the ring. • Removes: This counter is incremented when this interface receives Remove Ring Station MAC frame. • AC Errors: This counter is incremented when the upstream neighbor is unable to set Address Recognized Indication/Frame Copied Indication (ARI/FCI) bits in a frame that is has copied. • Token Errors: This counter is incremented when this port acting as the active monitor recognizes an error condition that needs a token transmitted. • Hard Errors: This counter is incremented when this interface is transmitting or receiving a beacon MAC frame. • Singles: This counter is incremented when this interface detects that it is the only station on a ring.
Frame Size Exceeded	This counter is incremented when the LAN port observes a frame that can not be forwarded because of excessive length.

Screen Term	***Description*** *(continued)*
Data Summary	Data Bytes Receive: Number of data bytes received from the LAN. Data Bytes Transmitted: Number of data bytes transmitted to the LAN.

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