Provides Instant Relief for Congested Token Ring Workgroups

Optimizes Local Switching with Adaptive Cut Through

Supports Plug-and-Play Installation

Delivers Leading Price/Performance Token Ring Workgroup Switch

The Centillion 10™ Token Ring Workgroup Switch provides a cost-effective solution for improving the performance of congested Token Ring workgroups. Switched connectivity eliminates the bottlenecks that result from multiple shared-access devices using the same 4 or 16 Mbps ring, improving performance by providing dedicated, switched links to key network resources and desktops.

Ideal for high-performance Token Ring workgroup environments, the switch delivers substantial performance improvements while preserving existing investments in hardware, cabling, adapters, and software. By providing 4/16 Mbps or 32 Mbps full-duplex switched connectivity, the Centillion 10 can deliver a dramatic increase in performance for environments containing local file and application servers, as well as those with peer-to-peer traffic.

By placing servers and power users on a Centillion 10 switch port, the available bandwidth for each device can be boosted significantly. This gives users access to 4/16 Mbps or even 32 Mbps full-duplex dedicated pipes, resulting in improved performance. In enterprise networks, Centillion 10 switches can be connected via fiber or copper connections from

Bay Networks System 5000™ or Centillion 100™ multi-LAN switching hubs in the backbone. The switch includes one expansion slot, which accommodates media-dependent expansion modules to increase port density or provide high-speed backbone connectivity through a choice of uplink modules.

The switch is easily deployed into existing network topologies and requires no recabling to install. The switch's sensing and configuration features automatically learn the operating speed of directly attached devices, minimizing the setup process and providing the network manager with a plug-and-play solution.

The Centillion 10 Token Ring Workgroup Switch adds an important, low-cost microsegmentation solution to the Bay Networks family of shared media and switched internetworking products. The unit supports industry-standard IEEE 802.5 Token Ring and ATM Forum specifications, enabling standards-based operation in any networking environment. Management is provided by Telnet, a command line interface, or SNMP-compliant management systems.

Bay Networks

Benefits

Provides Instant Relief for Congested Token Ring Workgroups

By segmenting workgroup rings to eliminate bottlenecks between servers and clients, network performance can be enhanced without the need to migrate to a higher data-rate technology. The Centillion 10 switch works within the existing network framework, allowing users to incrementally boost performance in workgroups where it is needed while protecting investments in existing cabling, software, and adapters.

Optimizes Local Switching with Adaptive Cut Through

The Centillion 10 employs cut-through switching for minimal latency. For best performance, cut-through switching is the superior approach in environments where all switching activity is conducted between local devices: AS400s or LAN servers and their clients, peer-to-peer, or even servers and clients sending output to network-attached printers.

Either for security or for optimized bandwidth utilization, some environments may prefer to sacrifice low latency for traffic management. To satisfy this requirement, Centillion 10 switch ports may be configured for store-and-forward frame switching instead of cut through. This enables per-port filtering to be applied, allowing protocol firewalling and reducing the bandwidth erosion often caused by protocol broadcasts.

The Centillion 10 also provides a third switching method: adaptive cut through. In this mode, the switch can be configured to alternate automatically between cut-through and store-and-forward switching, based on user-specified error thresholds. This approach is ideal for maximizing performance without wasting bandwidth in electromagnetically noisy environments where corrupted frames would otherwise be forwarded in cut-though mode.

Supports Plug-and-Play Installation

The Centillion 10 switch is simple to deploy, fitting into any Token Ring workgroup environment with a minimum of effort. The switch, which automatically learns the addresses of on-ring and off-ring stations, supports up to 1,790 MACs per port, allowing up to 10,000 MAC addresses to be stored in the switch's master table. In addition, each switch port automatically detects the operating speed of attached devices. Transparent bridging support avoids the complication of assigning a new ring number for each segment. To the rest of the network, the newly microsegmented workgroup ring appears to be completely unchanged, eliminating additional source route bridge hops.

Delivers Leading Price/Performance Token Ring Workgroup Switch

Featuring a low per-port price, 46,500 packets per second (pps) throughput with exceptionally low latency, and simple plug-and-play installation, the Centillion 10 delivers switched connectivity for Token Ring workgroups at well under half the ownership cost of most competitive solutions.
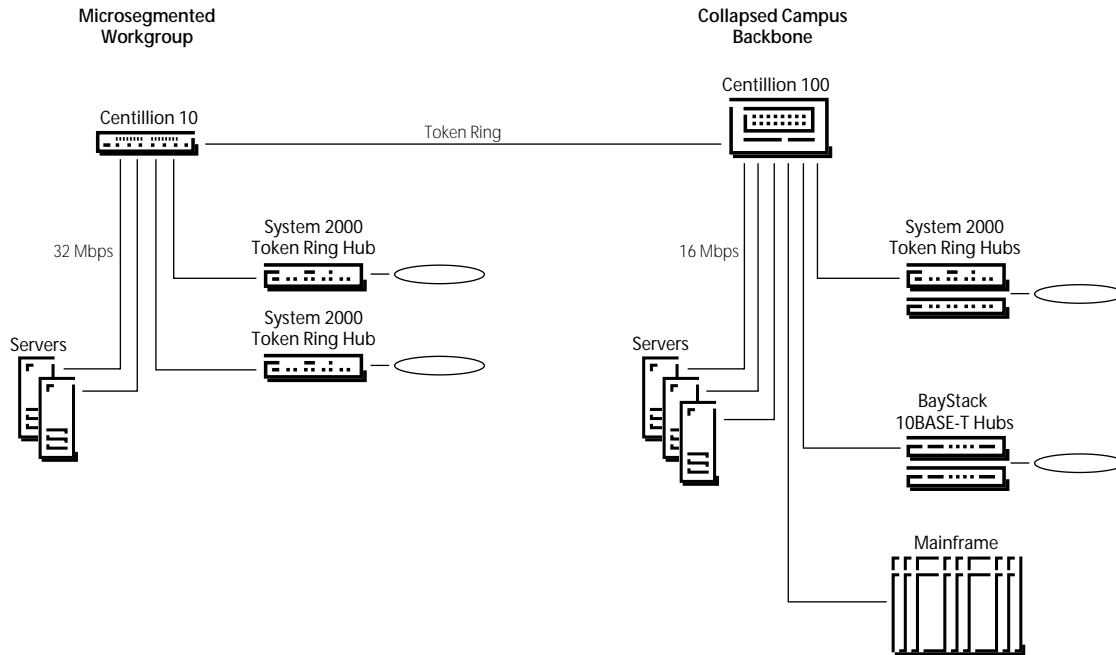
Features

Connectivity

The low-cost, high-performance Centillion 10 switch supports a wide variety of cabling media, enabling any cable currently supported for lobe connection of shared-access Token Ring stations to be used. The switch is shipped with eight preconfigured RJ-45 ports designed to support both unshielded twisted pair (UTP) and shielded twisted pair (STP) cabling at both 4 and 16 Mbps.

Additional port density can be achieved by installing an expansion module. A two-port fiber module provides expansion to hubs via their fiber Ring-In/Ring-Out (RI/RO) connector, or it can be used for connecting a Centillion 10 to a backbone switch. A four-port UTP/STP module equipped with RJ-45 connectors is also available. These expansion modules increase total switch port density to either 10 or 12.

In the future, the switch's expansion slot may be used to support a choice of high-speed uplinks for 155 Mbps SONET ATM networks. The ATM interface will allow the Centillion 10 to be linked to backbone switches such as the Centillion 100 multi-LAN/ATM switch and the System 5000 switching hub. The ATM interface will also run ATM Forum-compliant LAN emulation (LANE) software.

Figure 1 | **Centillion 10 and Centillion 100 Application**

Microsegmented
Workgroup

Collapsed Campus
Backbone

Centillion 100

Centillion 10

Token Ring

32 Mbps

16 Mbps

System 2000
Token Ring Hub

System 2000
Token Ring Hub

System 2000
Token Ring Hubs

Servers

Servers

BayStack
10BASE-T Hubs

Mainframe

Congestion Relief for Servers and Power Users

When servers and power users are given a dedicated switch port, significant increases in available bandwidth are realized, resulting in improved client/server performance (see Figure 1). If a full 16 Mbps link is still not sufficient, full-duplex (FDX) 32 Mbps Token Ring connectivity can provide a further boost. The Centillion 10 currently supports FDX connections to the IBM LANStreamer family of Token Ring adapters. IEEE 802.5-compliant FDX support will be available as a software upgrade in the future.

Transparent Bridging and Source Route Switching

The Centillion 10 utilizes transparent bridging as the standard method of bridging between switch ports. In a workgroup environment where the typical application for switching is to microsegment an existing ring, transparent bridging offers the most practical solution. Using transparent bridging rather than source route bridging eliminates the added complication of assigning a new ring number for each segment. When transparent bridging is used, only the ring that is microsegmented is affected; to the rest of the network, nothing appears to have changed. The Centillion 10 also supports an IEEE 802.1d-compliant Spanning Tree implementation, which enables the switch to coexist in even the most complex multibridge configurations.

Source route switching ensures complete interoperability with existing source route bridged environments. The switch learns the MAC addresses and a portion of the RIF from explorers and specifically routed frames coming from off-ring stations (i.e., stations on the other side of a bridge on a segment attached to a switch port). It uses the RIF of subsequent specifically routed frames to forward traffic onto the target bridge segments. With source route switching, all ports appear on the same logical ring.

The source route switching capability eliminates the need to assign ring and bridge numbers for the switch and its individual ports, greatly simplifying switch configuration and ongoing support. The absence of unique ring and bridge numbers on the switch also allows users to implement a network of Centillion 10s that is not affected by the seven hop limit of other source route bridges.

Automatic Configuration and Sensing

The Centillion 10 automatically configures each port to operate at the fastest speeds possible. The switch senses the device (hub, workstation, or switch) attached to each port, determines whether a 4 or 16 Mbps connection is needed, and makes the connection at half or full duplex. Crossover cables are not required to provide switched connectivity to power users or other switches.

Management

The switch supports standard SNMP MIBs, allowing management by SNMP-based applications. A wide selection of management options virtually eliminates the need to manage the switch locally. Telnet may be used over an in-band connection to manage and configure switch and port settings, and an RS-232 port is provided for out-of-band configuration and management via a VT100 terminal. In addition, support of BootP/TFTP allows new microcode to be downloaded to the switch from remote locations.

TokenProbe Support

The Centillion 10 supports TokenProbe, a network analysis capability that allows both in-bound and out-bound traffic on a switch port to be monitored by a protocol analyzer attached to another port. Full-duplex traffic can be monitored by analyzing the transmit and receive paths separately.

Traffic Management and Analysis

Security and traffic management features are also offered on the Centillion 10. Up to 30 port-level filters are available to screen frames by MAC address and related switch port number, creating a security firewall and preventing unauthorized access or delivery to other switch ports. Another method of segmenting traffic is through the use of the Virtual Switch feature, which allows the switch to be segmented into two to four nonoverlapping broadcast domains. This configuration is useful for managing traffic and isolating groups of users from restricted network resources. Logical bridge groups configured in this manner continue to appear to the rest of the network as the original, unsegmented ring.

Technical Specifications

Technical specifications for the Centillion 10 Token Ring Workgroup Switch appear in Table 1.

Table 1 | **Centillion 10 Technical Specifications**

Number of Ports	Eight Token Ring UTP/STP ports with RJ-45 connectors, one service port with DB-9 connector
Cabling	Supports shielded twisted pair cabling and unshielded twisted pair cabling (Category 3, 4, 5) Does not require external media filters.
Data Rate	4 or 16 Mbps half duplex; 32 Mbps full duplex
Port Forwarding	Wire speed port-to-port forwarding for 64-byte packets
Peak Throughput	46,500 pps unidirectional traffic (28-byte frames)
Aggregate Switching Capacity	64 Mbps (eight ports operating in half duplex)
Standards Compliance	IEEE 802.5 Token Ring
Configuration	Direct (VT-100-compatible terminal) or remote (modem) management via front panel EIA 232-C port Console functions also available via Telnet
Management	SNMP agent
Environmental Specifications	Operating Temperature: 50° to 104° F (10° to 40°C)
Physical Dimensions	(H) 2.6 in. x (W) 17.3 in. x (D) 14 in. [(H) 6.6 cm x (W) 44 cm x (D) 35.6 cm]
Mounting Options	19 in. universal EIA (Telco) rack Table mountable

Ordering Information

Ordering information for the Centillion 10 Token Ring Workgroup Switch appears in Table 2.

Table 2 | **Centillion 10 Ordering Information**

Order Number	Description
AS1712001	Centillion 10 Token Ring Workgroup Switch (8 UTP ports)
AS1104005	4-port Token Ring UTP Expansion Module
AS1104006	2-port Token Ring Fiber Expansion Module

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