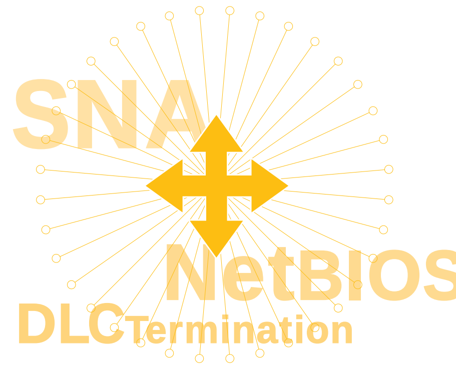
Routers

Protocols

Data Link Switching



Increases Network Connectivity and Interoperability

Optimizes Network Performance

Maximizes Network Availability

Enhances Investments

Bay Networks Data Link Switching (DLSw) allows SNA and NetBIOS applications to efficiently share a multiprotocol internetwork with other network computing applications. DLSw is an important transport service supported by Bay Networks Switched Internetworking Services (BaySIS™). BaySIS, an open architecture based on standards, supports today's internetworks and their evolution to switched internetworking.

Data Link Switching defines a method of reliably transporting SNA and NetBIOS traffic across a multiprotocol backbone. Designed for use in multiprotocol routers, DLSw provides switching at the data link layer or translation to TCP/IP for transport over an internetwork.

Bay Networks Routing Services (BayRS™) supports the Internet Engineering Task Force (IETF) Request for Comments (RFC) 1795, DLSw Version 1 and RFC 1434, Data Link Switching: Switch-to-Switch Protocol (DLSw SSP) with features including Data Link Control (DLC) Termination for LLC2 and SDLC, TCP/IP Transport, End-to-End Flow Control, Extended Source Route Bridge, Explorer Broadcast Reduction, NetBIOS Name Caching, and APPN support. These features ensure session availability and reliability, expand source route bridge network size, increase available WAN bandwidth, and reduce traffic on the internetwork.

Additionally, Bay Networks enhances DLSw application and performance with features including Integrated SDLC-LLC2 Conversion capability, SDLC Secondary for DLSw, BNN (RFC 1490) support, BAN support, and Unconfigured Peers. A DLSw traffic prioritization technique is also provided for efficient data transfer.

Bay Networks DLSw support of LAN and serial interfaces maximizes connectivity. The serial interfaces operate at rates up to 52 Mbps and support WAN links, such as Frame Relay, SMDS, PPP, ATM DXI, ISDN BRI, ISDN PRI, and X.25. Comprehensive Dial-up services are also supported.

The BayRS Multiline Circuits, Uniform Traffic Filters, Traffic Prioritization, and Data Compression optimize bandwidth and maximize traffic control. DLSw is easily configured on Bay Networks routers via Bay Networks Optivity Internetwork™. DLSw is supported on all Bay Networks routers.

Bay Networks family of routers, hubs, switches, remote access servers, and network management products comprise an end-to-end standards-based solution while providing a smooth transition to switched internetworking.

Bay Networks

Benefits

Increases Network Connectivity and Interoperability

Bay Networks DLSw support allows SNA and NetBIOS traffic to share a wide area backbone with multiprotocol LAN traffic. An entire DLSw network appears as a single hop, which allows source route bridge topologies to be extended past seven hops. Bay Networks RFC 1490 support and its support for the *Frame Relay Forum's Multiprotocol Encapsulation Implementation Agreement* (FRF.3) allows direct communications to an IBM 3745 controller and allows data from downstream SNA devices to be transmitted to an APPN network.

Optimizes Network Performance

Bay Networks support of Source Route Bridge Explorer Broadcast Reduction eliminates unnecessary broadcast traffic across the network backbone by caching remote MAC addresses on the local Bay Networks DLSw router. Similarly, bandwidth consumption is reduced through Bay Networks NetBIOS Name Caching. Bay Networks DLC Termination support also reduces overhead by locally terminating LLC2 sessions at the access router. Bay Networks End-to-End Flow Control mechanisms ensure that manageable amounts of data are passed across the interfaces.

Maximizes Network Availability

Bay Networks DLC Termination maintains SNA sessions by enabling a local router to issue "keep alive" messages and data acknowledgments. Additionally, IP's dynamic routing capability ensures high availability by rerouting traffic around internetwork failures.

Enhances Investments

Bay Networks DLSw implementation ensures interoperability and connectivity with other standards-based networking products. Extended Source Route Bridge is also fully interoperable with IBM source route bridges. DLSw is supported on all Bay Networks routers and can be easily implemented with a software upgrade.

Features

Standard Data Link Switching

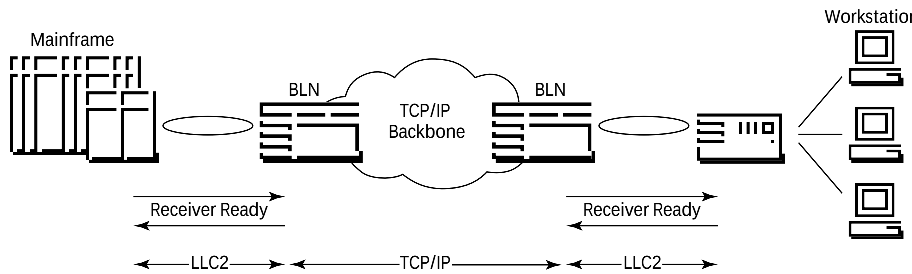
Bay Networks DLSw support is compliant with RFC 1795 and RFC 1434, ensuring an industry-standard approach for reliable and efficient transport of SNA and NetBIOS traffic across a multiprotocol internetwork. Bay Networks DLSw implementation supports standardized methods for the following features:

- TCP/IP Transport
- Local Data Link Control (DLC) Termination for LLC2 and SDLC
- End-to-End Flow Control
- Extended Source Route Bridge
- Explorer Broadcast Reduction
- MAC and NetBIOS Name Caching

DLSw is supported on all Bay Networks routers to provide high session reliability and extend multivendor interoperability for SNA and NetBIOS transport over a multiprotocol internetwork. Additionally, Bay Networks DLSw provides an integrated SDLC-to-LLC2 conversion feature and comprehensive RFC 1490 and 1795 support, which reduce costs and increase connectivity.

TCP/IP Transport DLSw specifies TCP/IP as the standard transport mechanism for SNA and NetBIOS traffic across an internetwork. Bay Networks TCP/IP Transport feature is a robust method for carrying SNA and NetBIOS traffic across a multiprotocol internetwork and allows SNA

Figure 1 **DLC Termination and TCP/IP Transport**



and NetBIOS to share a wide area backbone circuit with multiprotocol LAN traffic. Data packets from a Token Ring or Ethernet network are carried in LLC2 frames to an attached Bay Networks DLSw node where the data is translated from LLC2 into TCP/IP datagrams. The data is then routed over the multiprotocol backbone to a remote Bay Networks DLSw node using standard Internet Protocol (IP) routing technologies such as OSPF, RIP, RIP Version 2, or static routes. When the TCP/IP datagram reaches the remote Bay Networks DLSw node, it is translated back into an LLC2 frame and is source route bridged or transparently bridged to the destination (see Figure 1).

Using IP provides dynamic routing that increases network availability by automatically rerouting traffic around a failed link. Using TCP as the transport mechanism across the backbone ensures reliable transport.

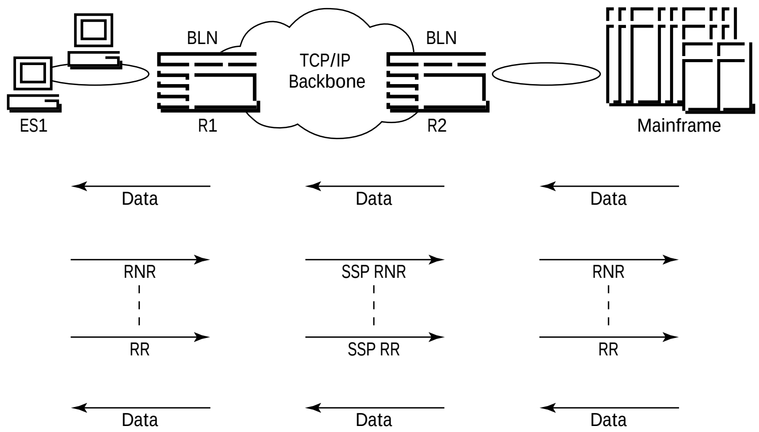
Bay Networks routers cache out-of-order packets, alleviating the need to retransmit multiple packets if part of the transmission is received. This maintains the response times required by many applications and reduces the burden on bandwidth and CPUs if a packet retransmission is needed.

Local Data Link Control (DLC) Termination for LLC2 and SDLC In today's integrated multiprotocol internetworks, connectivity between SNA devices and NetBIOS PCs is being extended across more diverse topologies. This introduces new network delays and increases the possibility of LLC2 session timeouts. Additionally, the large amount of data acknowledgment and "keep alive" traffic crossing the backbone significantly diminishes the wide area network's usable bandwidth.

Data Link Switching terminates the Data Link Control (LLC2 or SDLC) session at the router and provides Local Acknowledgment for LLC2 and SDLC traffic. Logical Link Control Type 2 (LLC2) is a connection-oriented protocol that operates at the data link layer, providing sequencing of MAC layer frames, error correction, and flow control between endstations. SNA and NetBIOS sessions generate large amounts of nondata transfer messages for controller synchronization and pre- and postdata transfer acknowledgment. Each message requires a response in a predefined amount of time. If a response is not received, the message is retransmitted, resulting in termination of the session.

Bay Networks DLC Termination maintains SNA sessions and lowers overhead traffic across the backbone by enabling the local router to terminate LLC2 sessions and issue data acknowledgment frames, such as Receiver Ready, Receiver Not Ready, and Reject (see Figure 1). DLC Termination reduces wide area network overhead and the possibility of session timeouts by eliminating acknowledgment frames from the backbone; only SNA and NetBIOS data traffic are passed over the backbone. Additionally, all timers are triggered locally, eliminating session timeouts.

Figure 2 **End-to-End Flow Control**



Bay Networks DLSw routers also maintain full DLC protocol state information, effectively preventing unnecessary DLC state information from traversing across the backbone. Additionally, the router dynamically learns about each MAC, reducing the amount of required predefinition. Furthermore, because the router maintains a record of the status of each MAC session, the router can properly inform each workstation of any network failure.

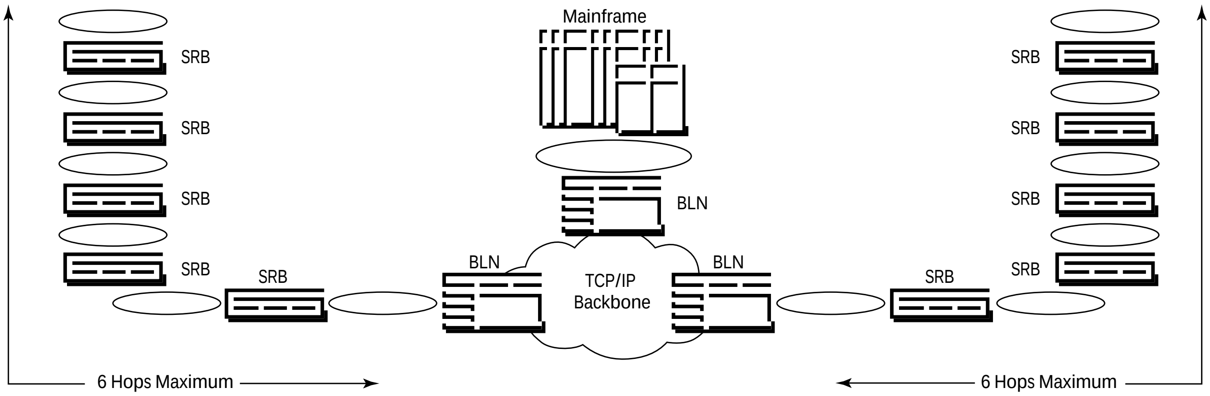
End-to-End Flow Control Bay Networks DLSw implementation provides flow control, which efficiently and reliably manages the DLSw data stream and safeguards it against data loss. Bay Networks flow control mechanism consists of a configurable bidirectional window mechanism with source quench frames (Receiver Not Ready — RNR) and a configurable packet buffer "credit" allocation mechanism. The credit mechanism is used with the window mechanism to avoid propagating RNRs across the network. These mechanisms ensure that only manageable amounts of data are transferred across the interface between the LLC2 and the TCP/IP protocols. The following describes the basic operation of Bay Networks Flow Control feature.

In Figure 2, if endstation ES1 is not able to process any additional data from the host due to high volume traffic, it issues an RNR frame to the LLC2 interface on router R1 to throttle back the flow of data over the LLC2 circuit. When router R1 receives the RNR, it stops sending to ES1 but continues to accept data destined for ES1 until the allocated credit amount is half full, at which time it sends a DLSw switch-to-switch protocol RNR frame (SSP RNR) to the remote Bay Networks DLSw router R2 over the TCP/IP connection.

When router R2 receives the SSP RNR frame, it formats an RNR frame and sends it to the remote station that is sending the data. When adequate resources become available and ES1 is able to process additional data, it sends a Receiver Ready (RR) frame to restart the data flow. This allows R1 to send its "stored" frames to ES1. After receiving all of this data, ES1 sends a confirmation that it has received all frames. When R1 receives the RR frame, it opens its credit buffer and generates an SSP RR frame to router R2, which in turn formats an RR frame and sends it to the host. The host then resumes sending data to ES1.

Bay Networks DLSw implementation also supports RFC 1795's variable window size of information, which adjusts based on whether previous traffic reached its destination or if congestion is encountered.

Figure 3 **Extended Source Route Bridge**



Extended Source Route Bridge

Bay Networks DLSw also overcomes the seven-hop count limit inherent in source route bridging. Through this feature, end-to-end paths of unlimited hops can be established via DLSw routers connected to an IP backbone. Up to six hops are supported on either side of the DLSw backbone, which can be an unlimited number of hops and appear to be a source route bridge network with a hop count of one (see Figure 3).

For example, with Extended Source Route Bridge, when an LLC2 packet is received, the local DLSw router terminates the routing information field (RIF) and translates the packet into a TCP/IP datagram. The packet is then routed over the backbone to a DLSw router attached to the destination's source route bridge network. When the packet is received by the remote DLSw router, it is translated back into an LLC2 packet with its hop count set at 1. The packet is then source route bridged to the destination using route information stored in the DLSw router.

The Extended Source Route Bridge feature is fully interoperable with IBM source route bridges, ensuring interoperability while extending source route bridging capabilities.

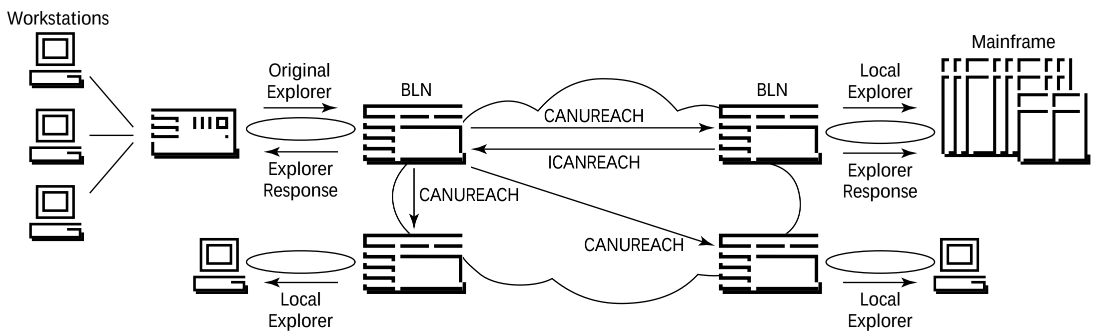
Explorer Broadcast Reduction

Bay Networks fully supports the DLSw specification for Explorer Broadcast Reduction that uses special control packets to reduce explorer traffic across the network backbone. These packets, referred to as CANUREACH and ICANREACH, dynamically discover endstations, and then direct subsequent source route bridge traffic to the DLSw router closest to the destination endstation (see Figure 4). This function reduces the global broadcast messages that are sent when new sessions are established.

When a Bay Networks DLSw router receives an explorer packet, it sends a CANUREACH packet to all known remote DLSw routers in the network. The remote DLSw routers, in turn, translate these packets into local explorer packets and send them out over their attached LANs. If the destination endstation is found, the endstation sends an explorer response packet to the router that sent the local explorer packet.

All DLSw routers that can reach the destination send an ICANREACH packet to the originating DLSw router. The originating router uses the first packet received to route traffic to the destination.

Figure 4 **Explorer Broadcast Reduction**



By supporting Source Route Bridge Explorer Broadcast Reduction, Bay Networks reduces broadcasts by limiting the number of CANUREACH messages. A Bay Networks router allows only a single CANUREACH packet to be sent for a particular destination address, eliminating unnecessary bandwidth consumption. Any additional requests for the same MAC address are queued at the router. Once the address and nearest DLSw router information has been cached, subsequent requests generated by other endstations on the network use the cache to forward packets.

MAC and NetBIOS Name Caching

Bay Networks significantly reduces another source of broadcast overhead in a source route bridge environment through its support for NetBIOS Name Caching. DLSw specifies NetBIOS Name Caching as the method used for reducing broadcasts of NetBIOS FIND NAME packets.

NetBIOS Name Caching uses packets similar to the CANUREACH and ICANREACH packets used in Explorer Broadcast Reduction to dynamically discover endstations. It then directs new NetBIOS traffic to specific routers using the same method described in Explorer Broadcast Reduction (see Figure 5). This improves network efficiency and reduces global broadcast messages that are sent when new sessions are established.

Bay Networks DLSw Enhancements

Bay Networks provides features to enhance DLSw performance, flexibility, and connectivity. These include a fully distributed Unconfigured Peers, Integrated SDLC-LLC2 Conversion, SDLC Secondary Support, Routed SNA over Frame Relay (RFC 1490) support, Boundary Access Node (BAN) support, and DLSw Prioritization.

Bay Networks fully distributed DLSw implementation scales to support large networks and increases network availability. Multiple Data Link Switches can be implemented on a single router, providing a cost-effective and manageable solution in IBM data center environments.

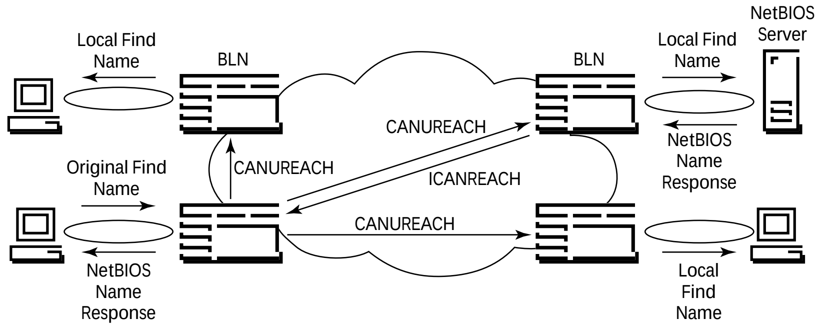
Bay Networks routers are the only routers capable of performing multiple processor-intensive processes, including DLSw, APPN, and OSPF concurrently without degrading performance. The distributed processor architecture of Bay Networks routers provides the reliability, availability, and serviceability required in SNA environments.

Unconfigured Peers Bay Networks Unconfigured Peer feature enables RFC 1434/1795-compliant DLSw peers, routers, and/or devices with similar DLSw capabilities to receive and respond to broadcast frames forwarded by a configured peer. This mechanism increases DLSw service connectivity by allowing DLSw peers in an IP network to learn the locations of previously unknown peers.

Integrated SDLC-LLC2 Conversion

Bay Networks Integrated SDLC Conversion functionality is an extension of its DLSw features and is a critical component for the integration of SNA and multiprotocol LAN networks.

Figure 5 **NetBIOS Name Caching**



Through this feature, SDLC sessions are terminated by a local Bay Networks router, which also converts the SDLC frames to LLC2 format, maps the SDLC addresses to Token Ring addresses, and arranges for transport to the destination host. Local termination of the SDLC sessions also allows the polling and acknowledgment activity normally conducted between the front-end processor (FEP) and the SDLC devices to be conducted between the local internetworking device and the SDLC devices, reducing overhead traffic across the wide area network.

Bay Networks DLSw implementation also decreases overhead and reduces traffic on the network via local termination of SDLC sessions at the DLSw router in software. SDLC termination provides local polling and acknowledgment to SDLC devices (PU Type 2.0 and PU 2.1) from the DLSw router, thereby eliminating the need for traditional SDLC polling from the FEP across the wide area links.

Bay Networks SDLC-to-LLC2 conversion seamlessly merges the low-speed SDLC traffic of an SNA network with the high-speed multiprotocol traffic capabilities of LANs onto one strategic, readily extensible and manageable backbone. This increases SNA network efficiency and productivity while providing a higher level of internetwork efficiency. Through a Bay Networks router, remote networks can be interconnected via WAN media operating over a range of services to form a highly reliable, high-performance and extensible enterprise network.

Bay Networks DLSw implementation allows LLC2 conversion to be implemented either in a single DLSw router or a paired switch implementation that involves two DLSw nodes and a TCP/IP connection over a wide area network. This allows the router to be configured to meet exact network configuration and transport requirements. A single router implementation can be used in environments that do not need to send DLSw traffic over a WAN.

Each SDLC interface can also be configured to support a number of SDLC and performance-tuning parameters, including flag count, Non-Return to Zero/Non-Return to Zero Inverted (NRZ/NRZI), half/full duplex, and maximum frame size. This allows the interface to be tailored to meet exact requirements, ensuring maximized operation. Support of these parameters results in a flexible implementation and easier installation into an existing network.

Bay Networks Integrated SDLC Conversion maintains network management PU visibility to VTAM. This provides direct visibility of the SDLC devices from NetView. The router is transparent to the LU-LU session flow. From NetView, the devices are viewed and managed as LAN-attached devices, with support for standard alerts and alarms using the NMVT protocol.

Bay Networks SDLC integration is manageable via SNMP. An SNMP agent will support SNMP commands, such as SET, GET, and GET-NEXT, to allow the devices to be controlled and monitored from SNMP management systems (such as HP OpenView, SunNet Manager, or NetView for AIX).

SDLC Secondary Support for DLSw For environments that do not have any direct LAN connectivity into the host, SDLC Secondary Support for DLSw enables Bay Networks routers to communicate directly to an FEP, such as an IBM 3745, 3725, or 3270. Downstream can be LAN, SDLC, or Frame Relay attached.

In LAN-attached device environments routers function as a remote LAN gateway. In SDLC-attached environments Bay Networks routers provide a function similar to Binary Synchronous Communications Pass-Through, a protocol encapsulation method that lets frames pass between protocols, to physically interconnect cluster controllers and other SDLC devices in an integrated SNA internetwork. Local termination is used in SDLC-attached environments, providing enhanced response times and session availability.

SDLC secondary support allows a single line into the FEP to support multiple downstream SNA devices. Downstream devices on different media and routers can share a line into the FEP. This increases connectivity and reduces costs.

Routed SNA over Frame Relay (RFC 1490) Support Bay Networks fully supports RFC 1490 Multiprotocol Interconnect over Frame Relay and the *Frame Relay Forum FRF.3 Multiprotocol Encapsulation Implementation Agreement*. These allow direct communications from a Bay Networks router to an IBM 3745 communications controller via a Frame Relay network, eliminating the need for additional equipment. It also allows communications from a downstream Frame Relay SNA device directly to a Bay Networks router for connection to an APPN network. Additionally, native SNA can also be used between two Bay Networks routers.

Boundary Access Node (BAN) Support Bay Networks support of BAN eases the configuration of SNA devices into a multiprotocol LAN environment while ensuring the performance and reliability critical to SNA applications. Dual host attachment to mainframes with the same MAC address is also supported to provide the additional redundancy required by SNA environments. BAN also reduces administrative costs by easing network configuration.

DLSw Prioritization Preferences can be assigned to specific types of traffic supported by DLSw. User-configurable prioritization filters are used to place Token Ring, Ethernet, SDLC, RFC 1490 (Frame Relay), and other source route bridged traffic into one of ten queues. Up to 32 filters can be assigned per queue; traffic not matching any filter is placed in a default queue (Q0). Using an allocated bandwidth technique, DLSw then pulls information from each queue and transfers the packet to TCP for sequencing. Priorities can be assigned to packets based on their protocol, source network, destination network, packet type, and other protocol-specific fields, as well as other fields that are identifiable by an offset in a packet.

DLSw Prioritization uses a bandwidth allocation dequeuing algorithm to transmit packets. The bandwidth allocation dequeuing algorithm allows packets from each queue to be transmitted based on user-assigned bandwidth allocation percentages for each queue. This ensures that packets assigned lower priorities are transmitted in environments with large amounts of high-priority traffic.

DLSw can be used separately or with Bay Networks other data prioritization tool — Traffic Prioritization — to ensure fast and efficient data transfer over a serial link.

Local Area Network Support
Bay Networks Token Ring, Ethernet, 100BASE-T, and FDDI network interfaces support DLSw. Bay Networks Token Ring interfaces can be easily configured to support either 4 or 16 Mbps ring speeds. This capability increases network performance while eliminating equipment obsolescence.

Wide Area Networking Support
Bay Networks Synchronous and HSSI interfaces support Bay Networks Data Link Switching implementation. This allows a Bay Networks node to transport SNA and NetBIOS traffic over large geographic areas via a variety of WAN services. Serial interfaces operate at rates ranging from 1,200 bps to 52 Mbps, full duplex, and support V.35, RS-232, RS-449/RS-422 balanced, X.21, and HSSI. Networks can also be interconnected via a variety of WAN services, including X.25, RFC 1490-compliant Frame Relay bridge/routed format, SMDS, ATM DXI, or point-to-point circuits using PPP or HDLC encapsulation.

Dial Backup and Dial-on-Demand using Raise DTR and V.25bis dial signaling are also supported by Bay Networks Data Link Switching implementation over V.35 and RS-232 interfaces.

Traffic Management
Comprehensive traffic management capabilities for DLSw environments are provided through BayRS traffic management features that include Multiline Circuit Support, Uniform Traffic Filters, Traffic Prioritization, and Data Compression.

Multiline Circuits Multiline Circuits allows a single circuit to be composed of up to 16 individual serial network data paths, ensuring circuit availability in the event of a single data path failure. Multiline Circuits also increases bandwidth between two sites without the circuit management complexities associated with multiple circuits. Following initial configuration, the use of multiple data paths to form a single circuit is completely transparent.

Multiline Circuits provides address-based selection for transmitting traffic over the data paths. Address-based selection determines the path a packet takes based on its source and destination addresses. Once a path has been established for a given address pair, subsequent packets follow the same path. This ensures the sequentiality of packets and is a valuable feature for protocols that cannot tolerate packets received out of order.

Uniform Traffic Filters Uniform Traffic Filters enables inbound and outbound traffic filters to be easily established for all network and bridge protocol traffic. Uniform Traffic Filters provides an efficient method for developing an effective and comprehensive network security strategy. In addition, Uniform Traffic Filters preserves WAN bandwidth and can increase performance by reducing network congestion.

Inbound traffic filters can be configured to accept or drop incoming packets from any Bay Networks router's local area, ATM, or serial network interface. Outbound traffic filters can be configured to drop outgoing packets destined for any Bay Networks router's serial interface. Additionally, Uniform Traffic Filters can be configured to execute a log action when a datagram's fields match the values defined in the filter.

Filters can be created using predefined protocol-specific fields or user-defined fields. Up to 31 inbound filters and 31 outbound filters (including Traffic Prioritization filters) can be defined for each protocol on every supported network interface. Filter precedence can be configured on an interface, reducing filter definition complexity. All filters are configured via Site Manager, the node management application for Bay Networks routers.

Traffic Prioritization Traffic Prioritization filters can assign a high priority to time-sensitive and/or mission-critical traffic, thereby reducing the occurrence of session timeouts and improving application response times. Priority filters can be configured that place packets into one of three priority queues — high, normal, or low — for transmission through a Bay Networks router's outbound serial interface. Priority filters can be applied to the complete family of network and bridging protocols supported by Bay Networks routers.

Priorities can be assigned to packets based on their protocol, source network, destination network, packet type, and other protocol-specific fields, as well as other fields that are identifiable by an offset in a packet. The number of Traffic Prioritization filters defined for a protocol on an interface depends on the number of outbound Uniform Traffic Filters assigned to the protocol on the interface. For example, if there are no outbound Uniform Traffic Filters defined for a protocol, then a total of 31 priority filters can be assigned. However, if, for example, 16 outbound Uniform Traffic Filters are defined for a protocol, then only a total of 15 Traffic Prioritization filters can be assigned.

Traffic Prioritization features can be configured to use a bandwidth allocation dequeuing algorithm or a strict dequeuing algorithm to transmit packets across a serial line. The bandwidth allocation dequeuing algorithm operates in the exact manner as in DLSw to allow packets from the normal and low-priority queues to be transmitted when the high-priority queue still contains packets, based on user-assigned bandwidth allocation percentages for each queue. The strict dequeuing algorithm transmits all packets from the high-priority queue before transmitting packets from the normal and low-priority queues. Each serial line attached to a Bay Networks router can use the strict or bandwidth allocation dequeuing algorithm and can be reconfigured at any time in response to changes in configuration and/or performance requirements.

Data Compression Configurable on a per-circuit or link basis, Bay Networks software-based Data Compression feature is supported by all Bay Networks routers, maximizing internetwork performance by reducing the amount of bandwidth required to transport LAN protocols over the wide area. Data Compression is currently supported over dial-up lines, including ISDN and leased lines using PPP, Frame Relay, and X.25. Based on a Lempel-Ziv algorithm, Bay Networks payload compression mechanism provides a compressed throughput of up to 1.2 Mbps, full duplex, over a 512 Kbps link.

Support is provided for either Continuous or Packet-by-Packet compression modes. Continuous mode maintains a compression history across packet boundaries and requires that the histories at each end of the link be synchronized through the use of a reliable data link protocol. Packet mode resets the history for each packet and does not require a reliable data link protocol. Continuous mode is recommended for maximum compression efficiency.

Network Management

Bay Networks offers comprehensive router and network management capabilities to ensure the efficient operation of mission-critical internetworks. Features increase diagnostic capabilities across the internetwork, simplify node and network configuration management, and interoperate with third-party solutions for increased interoperability.

Optivity Internetwork A component of Bay Networks UNIX-based Optivity Enterprise™ application suite, Optivity Internetwork provides a sophisticated, yet easy-to-use management solution for complex router-based internetworks. Optivity Internetwork simplifies and improves management of complex router internetworks by integrating Control-Center™, the revision control system for Bay Networks routers; Site Manager, the node management application for Bay Networks routers; RouterMan™, an intuitive router-monitoring application; and PathMan™, a graphical network diagnostic tool.

Optivity Internetwork operates with the leading SNMP platforms — HP OpenView, IBM NetView for AIX, and Solstice SunNet Manager for additional capabilities.

Standards

The DLSw implementation described in this data sheet supports major IETF RFCs and Frame Relay Forum (FRF) specifications as shown in Table 1.

Table 1 **Data Link Switching (DLSw) Standards**

IETF	RFC 1434, Data Link Switching: Switch-to-Switch Protocol
	RFC 1795, Data Link Switching: Version 1.0
	RFC 1490, Multiprotocol Interconnect over Frame Relay
Frame Relay Forum	FRF.3, Multiprotocol Encapsulation Implementation Agreement, 1993

System Requirements

Bay Networks DLSw implementation described in this data sheet is supported in Bay Networks Routing Services (BayRS) Version 11.0 or later for Bay Networks BayStack™ Access Node (AN®), BayStack Access Node Hub (ANH™), Access Stack Node (ASN™), Backbone Link Node (BLN®), Backbone Concentrator Node (BCN®), Link Node (LN®), and Concentrator Node (CN®) unless otherwise indicated.

Ordering Information

DLSw is available in a variety of BayRS suites for the Bay Networks AN, ANH, ASN, BLN, BCN, LN, and CN as shown in Table 2.

Table 2 **Data Link Switching (DLSw) Ordering Information**

Model Number	Description
AE0008033	AN/ANH BayRS Remote Office on 4 MB Flash
AE0008034	AN/ANH BayRS Corporate Suite on 4 MB Flash
AE0008037	AN/ANH BayRS Remote Office on 8 MB Flash
AE0008038	AN/ANH BayRS Corporate Suite on 8 MB Flash
AF0008017	ASN BayRS System Suite
AF0008020	ASN BayRS Corporate Suite (required for SDLC support)
AG0008017	BLN and BCN BayRS System Suite
AG0008020	BLN and BCN BayRS Corporate Suite (required for SDLC support)
40012V###*	LN and CN BayRS System Suite
42020V###*	LN and CN BayRS Corporate Suite (required for SDLC support)

* ### = Software version number (e.g., Version 11.0 = 011).

DLSw is also available in the BayRS LAN suite and BayRS WAN suite for the ASN, BLN, and BCN.

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