Release Notes for BayRS Version 13.00

BayRS Version 13.00
Site Manager Software Version 7.00
BCC Version 4.05

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Bay Networks *Where Information Flows.*™

Bay Networks Where Information Flows™

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Contents

Tables

Preface

BayRS Version 13.00 is a major software release that consolidates all new features, functionality, fixes, and significant software changes made since BayRS Version 12.00. These changes were introduced in BayRS Versions 12.10 and 12.20 (feature releases) and BayRS Versions 12.01 and 12.02 (maintenance releases). BayRS Version 13.00 contains no new features or functionality. These release notes contains guidelines for using BayRS Version 13.00.

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- The “Guides/Books” section lists books on technical topics.
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Make a note of the part numbers and prices of the items that you want to order. Use the “Marketing Collateral Catalog description” link to place an order and to print the order form.

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Release Notes for BayRS Version 13.00

This document contains the latest information about Bay Networks® BayRS™ Version 13.00.

These release notes include information about:

- Year 2000 Compliance
- Upgrading to Version 13.00
- Event Messages Database
- Quick2Config
- SunOS 4.1.4 Support for Site Manager
- Using the BCC
- New Features in BayRS Version 13.00
- New Hardware for BayRS 13.00
- Guidelines for Working with BayRS Version 13.00
- Operating Limitations
- Protocols Supported
- Standards Supported
- Flash Memory Cards Supported

Year 2000 Compliance

BayRS Version 13.00 and Site Manager Software Version 7.00 are Year 2000 Compliance Certified by Bay Networks. They have successfully passed the Bay Networks Test Procedure, which tests conformance to the Bay Networks Year 2000 compliance definition, both of which can be found at the Bay Networks Year 2000 Web Site at *http://www.baynetworks.com/year2000/*.

Upgrading to Version 13.00

To upgrade BayRS to Version 13.00, or to upgrade Site Manager software to Version 7.00, see *Upgrading Routers to BayRS Version 13.xx*, in your upgrade package.

Upgrading L2TP Configurations

If you have a BayRS Version 12.10 configuration file that includes L2TP operating on a router using BayRS Version 13.00, the router automatically upgrades the assigned user network addresses to Version 12.20 L2TP IP interface addresses. L2TP IP interface addresses are internal to the router. When communicating with the remote user, the router associates the user's IP address with an L2TP IP interface address that you configure.

The user network addresses assigned to Version 12.10 apply to the entire router. In Version 13.00, each slot has a unique L2TP IP address. Consequently, if the number of configured L2TP slots is greater than the number of configured assigned user network addresses, the router may not be able to upgrade every slot from a Version 12.10 configuration to a Version 13.00 configuration.

The router automatically converts all assigned user network addresses to L2TP IP addresses. For slots that exceed the number of assigned user network addresses, you will need to manually configure L2TP IP interface addresses. To do this, delete L2TP from the slot, then configure a new L2TP interface. Each slot must have L2TP IP interface addresses.

Upgrading OSPF Configurations

When you upgrade BayRs from releases earlier than Version 12.20, there cannot be an OSPF MTU interface mismatch; otherwise, adjacencies will not form between upgraded routers. All the OSPF routers forming adjacencies on a segment (broadcast, PPP, Point-to-Multipoint or NBMA) should have the same OSPF MTU size. You can verify the OSPF MTU sizes from Site Manager or the Technician Interface.

BayRS Versions 12.20 and later comply with RFC 2178, which requires this feature.

Upgrading the BCC Help File

The following information updates instructions relating to the BCC help file mentioned in *Upgrading Routers to BayRS Version 13.xx*.

If you received a flash card with the BayRS 13.00 (BCC4.05) image, it should also contain the BCC help file, *bcc.help*. The BCC looks for this filename as soon as you enter the first **help** <*option*> command after booting the router using the new 13.00 image.

If *bcc.help* is not already on the default volume in the router, you must transfer it from the BayRS 13.00 software CD to that volume. The BCC help file on the BayRS software CD has the name, *bcc_help*. When you transfer that file to the router, be sure to rename it as *bcc.help*. (The 13.00 router software is not configured by default to recognize the filename *bcc_help*.)

Event Messages Database

With BayRS Version 13.00, you can view the event messages database on the World Wide Web. To access the database, go to

http://support.baynetworks.com/library/tpubs/

and navigate to the BayRS category. The event messages database includes a search facility that allows you to find information easily and perform searches for keywords. You can sort events by entity number, event number, severity, and text of the event message. For example, you can list only the warning messages for the IPEX entity.

Quick2Config

Quick2Config Version 1.3.2, which shipped with BayRS Version 12.20, was the final release of Quick2Config. Quick2Config Version 1.3.2 is not compatible with BayRS Version 13.00 or later, and there will be no new versions of Quick2Config for these releases. Bay Networks will maintain Quick2Config Version 1.3.2 until early 2001.

You can continue to configure routers with Site Manager and the BCC.

SunOS 4.1.4 Support for Site Manager

Customers using Site Manager with SunOS 4.1.4 must plan to migrate to a supported Solaris OS platform. Site Manager Version 7.20 will be the last release that will ship with SunOS support. Site Manager releases later than 7.20 will not work with SunOS, but will continue to work with Solaris and other supported operating systems.

Using the BCC

The BCC™ is a command-line interface for configuring Bay Networks devices. It also supports Technician Interface commands and scripts.

Before using the BCC, refer to the following sections listing the platforms, protocols, and interfaces that the BCC supports.

Platforms Supported

The BCC runs on AN®, ANH™, ARN™, ASN ®, System 5000™, and BN® platforms including ARE, FRE®, and FRE-2 processor modules. Each slot must have:

- 16 MB of dynamic RAM (DRAM)
- 2 MB of free memory space available when you start the BCC

If you try to start the BCC with insufficient DRAM or free memory on a slot, the BCC returns an error message. In that case, use Site Manager instead of the BCC.

Number of BCC Sessions

You can open one BCC session per slot in read-write (configuration) mode. Other users can open additional BCC sessions in read-only (nonconfiguration) mode, depending on memory resources available on the slot supporting your login session. When memory requirements are insufficient to support additional BCC sessions on a login slot, the system displays the following message:

`BCC requires 2MB of free memory. Current available memory is` *<numeric value of current available memory>*.

All BCC sessions are mutually exclusive. If you make a change in a BCC session in read-write mode, this change does not appear in another BCC session.

Changing Sync to Serial

In BCC syntax, the term “sync” has been changed to “serial.” This global change affects all sync-related **config** or **show** commands.

BCC Help Initialization

Obtaining a response from a BCC Help request may require an initialization time of about one minute. This initialization occurs only when issuing the first Help command after booting the device. Subsequent requests for BCC Help information take only one or two seconds.

Interfaces Supported

You can use BCC commands to configure the following interfaces:

- ATM
- Console
- DCM
- DSU/CSU
- Ethernet
- FDDI
- FT1
- HSSI
- ISDN/BRI

- MCE1/MCT1
- Serial (synchronous)
- Token ring
- V.34 modem adapter (for the ARN router)
- Virtual (referred to in Site Manager as Circuitless IP)

Tables 1 through 5 on pages 8 to 13 list the link and net modules that the BCC supports.

Global Protocols Supported

You can use BCC commands to configure the following global protocols:

- ARP
- BGP (including accept and announce policies)
- FTP
- HTTP
- IGMP
- IP (including access policies, static routes, and adjacent hosts)
- IPX (including static-netbios-route)
- IPXWAN
- NTP
- OSPF (including accept and announce policies)
- RIP (including accept and announce policies)
- SNMP
- Telnet
- TFTP

Interface Protocols Supported

You can use BCC commands to configure the following interface protocols:

- ARP
- ATM
- Dial backup
- Frame relay (multiline not supported)

- IGMP
- IP
- IPX
- OSPF
- PPP (certain line parameters only; no multiline or multilink supported)
- Proprietary Standard Point-to-Point
- RIP
- Router Discovery (RDISC)

Getting Started

Caution: BCC configuration and **source** commands make immediate changes to the active device configuration. Read about the **source** command in *Using the Bay Command Console*.

Before using the BCC, save your configuration files by copying them onto the same flash memory card using new file names.

To start the BCC, enter **bcc** at the Technician Interface prompt.

To display the online instructions for new BCC users, enter **help learning-bcc** at the bcc> prompt. Then to display a full summary of the Help features of the BCC interface, enter **help -more**.

For more information about how to use the BCC interface, see *Using the Bay Command Console.*

For instructions on using the BCC to add and change protocol services, see the documentation for that protocol.

If you use the BCC **show config** command to view a router configuration, the BCC displays only the components or protocols that it supports.

Deleting Interfaces with the BCC

Before using the BCC to delete an interface, make sure that you did not use Site Manager to configure it with a protocol that the BCC does not recognize. If you did, use Site Manager to delete the interface.

Identifying Board Types

Tables 1 through 5 identify the Board Type parameter values displayed by the BCC. Use the "Board Type" column to identify a hardware module in an AN, ANH, ARN, ASN, BN, or System 5000 router configuration.

Note: You cannot use BCC commands to configure the operation of an FE1 adapter module for any AN or ANH router, or an X.25 PAD or V.34 console modem daughterboard for the ARN router. (Use Site Manager to configure these daughterboards.) Inserting a daughterboard into an AN base module redefines its module ID and board type.

Table 1 lists the AN and ANH board types.

Table 1. BCC Board Types: AN and ANH Modules

BCC Board Type	Technician Interface or MIB Module ID	Description
andeds	1033	AN-ENET (2 Ethernet ports, 2 serial ports)
andedsg	1050	ANH-8 (2 Ethernet ports, 2 serial ports) and an 8-port Ethernet hub active for the first Ethernet port
andedsh	1035	ANH-12 (2 Ethernet ports, 2 serial ports) and a 12-port Ethernet hub
andedst	1034	AN-ENET (2 Ethernet ports, 2 serial ports, 1 token ring port)
andst	1037	AN-TOKEN (2 serial ports, 1 token ring port)
ansdsedst	1041	AN-ENET/TOKEN (1 Ethernet port, 2 serial ports, 1 token ring port)
anseds	1024	AN-ENET (1 Ethernet port, 2 serial ports) with 16 MB DRAM
ansedsg	1047	ANH-8 (1 Ethernet port, 2 serial ports) and an 8-port Ethernet hub
ansedsh	1026	ANH-12 (1 Ethernet port, 2 serial ports) and a 12-port Ethernet hub
ansedst	1025	AN-ENET/TOKEN (1 Ethernet port, 2 serial ports, 1 token ring port) with 16 MB DRAM
ansets	1030	AN-ENET (1 Ethernet port, 3 serial ports) with 16 MB DRAM
ansetsg	1049	ANH-8 (1 Ethernet port, 3 serial ports) and an 8-port Ethernet hub

(continued)

Table 1. BCC Board Types: AN and ANH Modules *(continued)*

BCC Board Type	Technician Interface or MIB Module ID	Description
ansetsh	1032	ANH-12 (1 Ethernet port, 3 serial ports) and a 12-port Ethernet hub
ansetst	1031	AN-ETS (1 Ethernet port, 3 serial ports, 1 token ring port)
antst	1039	AN-TOKEN (3 serial, 1 token ring port)
ansedsi	1027	AN-ENET with ISDN (2 Ethernet ports, 2 serial ports) with 16 MB DRAM
ansedsti	1028	AN-ENET/TOKEN with ISDN (1 Ethernet port, 2 serial ports, 1 token ring port)
ansedshi	1029	ANH-12 with ISDN (1 Ethernet port, 2 serial ports) and a 12-port Ethernet hub
andsti	1038	AN-TOKEN with ISDN (2 serial ports, 1 token ring port)
ansedsgx	1048	ANH-8 with DCM (1 Ethernet port, 2 serial ports) and an 8-port Ethernet hub
ansedsgi	1051	ANH-8 with ISDN (1 Ethernet port, 2 serial ports) and an 8-port Ethernet hub
ansedsx	1055	AN-ENET with DCM (2 Ethernet ports, 2 serial ports)
ansedstx	1058	AN-ENET/TOKEN with DCM (1 Ethernet port, 2 serial ports, 1 token ring port) with 16 MB DRAM
ansedsc	1090	AN-ENET with CSU/DSU (2 Ethernet ports, 2 serial ports)
andstc	1091	AN-TOKEN with CSU/DSU (2 serial ports, 1 token ring port)
ansedstc	1092	AN-ENET/TOKEN with CSU/DSU (1 Ethernet port, 2 serial ports, 1 token ring port)
ansedshc	1093	ANH-12 with CSU/DSU (1 Ethernet port, 2 serial ports) and a 12-port Ethernet hub
ansedsgc	1094	ANH-8 with CSU/DSU (1 Ethernet port, 2 serial ports) and an 8-port Ethernet hub
ansedsf	1100	AN-ENET with T1/FT1 (2 Ethernet ports, 2 serial ports)
ansedshf	1106	ANH-12 with T1/FT1 (1 Ethernet port, 2 serial ports) and a 12-port Ethernet hub
ansedsgf	1108	ANH-8 with T1/FT1 (1 Ethernet port, 2 serial ports) and an 8-port Ethernet hub

Table 2 lists the BLN and BCN board types.

Table 2. BCC Board Types: BLN and BCN Modules

BCC Board Type	Technician Interface or MIB Module ID	Site Manager Model Number	Description
comp	4353	AG2104037	Octal Sync with 32-context compression daughterboard
comp128	4354	AG2104038	Octal Sync with 128-context compression daughterboard
de100	4864	50038	100BASE-T Ethernet
dst416	40	5740	Dual Sync with token ring
dtok	176	5710	Dual token ring
enet3	132	5505	Dual Ethernet
esaf	236	5531	Dual Sync Dual Ethernet with 2-CAM filters
		5532	Dual Sync Dual Ethernet with 6-CAM filters
esafnf	232	5431	Dual Sync Dual Ethernet without hardware filters
osync	4352	5008	Octal Sync
qef	164	5950	Quad Ethernet with hardware filters
qenf	162	5450	Quad Ethernet without hardware filters
qtok	256	50021	Quad token ring
shssi	225	5295	HSSI
sse	118	5410	Single Sync with Ethernet
sync	80	5280	Quad Sync
wffddi1m	193	5943	Hybrid FDDI with single mode on connector B
wffddi1mf	197	5949	Hybrid FDDI with single mode on connector B and with hardware filters
wffddi1s	195	5942	Hybrid FDDI with single mode on connector A
wffddi1sf	199	5948	Hybrid FDDI with single mode on connector A and with hardware filters
wffddi2m	192	5930	Multimode FDDI
wffddi2mf	196	5946	Multimode FDDI with hardware filters
wffddi2s	194	5940	Single Mode FDDI

(continued)

Table 2. BCC Board Types: BLN and BCN Modules *(continued)*

BCC Board Type	Technician Interface or MIB Module ID	Site Manager Model Number	Description
wffddi2sf	198	5947	Single Mode FDDI with hardware filters
atmcoc3mm	4608	AG13110112	ATM STS-3/STM-1 MMF
atmcoc3sm	4609	AG13110113	ATM STS-3/STM-1 SMF
atmce3	5121	AG13110114	ATM E3
atmcds3	5120	AG13110115	ATM DS-3
smct1	169	5944	Single Port MCT1e
mct1	168	5945	Dual Port MCT1
qmct1db15	5377	AG2111007	Quad Port MCT1 DB15
qmct1ds0a	5378	AG2104052	Quad Port MCT1 DB15 with DS0A
smce1ii75	189	AG2111003	75-ohm Single Port Multichannel E1 (MCE1-II) for 75-ohm Leased Line
mce1ii75	188	AG2111004	75-ohm Dual Port Multichannel E1 (MCE1-II) for 75-ohm Leased Line
smce1ii120	191	AG2111001	120-ohm Single Port Multichannel E1 (MCE1-II) for ISDN PRI and Leased Line
mce1ii120	190	AG2111002	120-ohm Dual Port Multichannel E1 (MCE1-II) for ISDN PRI and Leased Line

Table 3 lists the ASN board types.

Table 3. BCC Board Types: ASN Modules

BCC Board Type	Technician Interface or MIB Module ID	Description
denm	1280	Dual Port Ethernet Net Module
dsnm1n	1540	Dual Port Synchronous Net Module
dtnm	2048	Dual Port Token Ring Net Module
qsyncm	1664	Quad Port Synchronous Net Module
spex	512	SPEX Net Module
spexhsd	769	SPEX - Hot Swap Net Module

(continued)

Table 3. BCC Board Types: ASN Modules *(continued)*

BCC Board Type	Technician Interface or MIB Module ID	Description
mmfsddas	1793	Multimode FDDI Net Module
smfsddas	1801	Single Mode FDDI Net Module
smammbdas	1825	Hybrid PHY A FDDI Net Module
mmasmbdas	1833	Hybrid PHY B FDDI Net Module
dsnm1nisdn	1588	ISDN BRI/Dual Sync Net Module
mce1nm	2816	MCE1 Net Module
asnqbri	2560	Quad BRI Net Module
se100nm	2304	100BASE-T Ethernet Net Module
dmct1nm	2944	Dual Port MCT1 Net Module
shssinm	3584	HSSI Net Module

Table 4 lists the ARN board types.

Table 4. BCC Board Types: ARN Modules

BCC Board Type	Technician Interface or MIB Module ID	Description
arnmbstr	8704	ARN Token Ring Base Module with 0, 8, 16, or 32 MB DRAM
arnmbsen	8720	ARN Ethernet Base Module with 0, 4, 8, 16, or 32 DRAM
arnmbenx10	8896	ARN Ethernet Base Module - xxMB DRAM with DCM
arnssync	8736	ARN Serial Adapter Module
arnis	8784	ARN ISDN BRI S/T Adapter Module
arnisdnu	8800	ARN ISDN BRI U Adapter Module
arndcsu	8768	ARN 56/64K DSU/CSU Adapter Module
arnv34	8752	ARN V.34 Modem Adapter Module
arnft1	8776	T1/FT1 DSU/CSU Adapter Module
arntsync	8848	ARN Tri-Serial Port Expansion Module
arnsenet	8832	ARN Ethernet Port Expansion Module
arnstkrg	8816	ARN Token Ring Expansion Module

(continued)

Table 4. BCC Board Types: ARN Modules *(continued)*

BCC Board Type	Technician Interface or MIB Module ID	Description
arnentsync	8864	ARN Ethernet and Tri-Serial Expansion Module
arnisdnu	8880	ARN Token Ring and Tri-Serial Expansion Module
arnpbtenx10	8960	ARN Ethernet and Tri-Serial Expansion Module with DCM
arnpbenx10	8928	ARN Ethernet Expansion Module with DCM

Table 5 lists the System 5000 board types.

Table 5. BCC Board Types: System 5000 Modules

BCC Board Type	Technician Interface or MIB Module ID	Description
se100nm	2304	Router 100BASE-T Ethernet Net Module
denm	1280	Router Dual Ethernet Net Module
dsnm1n	1540	Router Dual Synchronous Net Module
dtnm	2048	Router Dual Token Ring Net Module
qsyncnm	1664	Router Quad Port Synchronous Net Module
iqe	1408	5380 Ethernet Router Module
iqtok	2176	5580 Token Ring Router Module
mmfsddas	1793	Router Multimode FDDI Net Module
smfsddas	1801	Router Single Mode FDDI Net Module
smammbdas	1825	Router Hybrid PHY A FDDI Net Module
mmasmbdas	1833	Router Hybrid PHY B FDDI Net Module
asnqbri	2560	Router Quad Port ISDN BRI Net Module
mce1nm	2816	Router MCE1 Net Module
dmct1nm	2944	Router Dual Port MCT1 Net Module
shssinm	3584	Router HSSI Net Module
atm5000bh	524544	Centillion Multiprotocol Engine

Sending BCC Feedback

After you use the BCC, we welcome your feedback. Please visit the BCC Web site at the following URL, where you can leave us a message:

http://support.baynetworks.com/library/tpubs/bccfeedbk

New Features in BayRS Version 13.00

BayRS Version 13.00 is a major software release that consolidates all new features, functionality, fixes, and significant software changes made since BayRS Version 12.00. In this section, you can read about features that have been introduced since BayRS Version 12.00.

New Features in BayRS Version 12.20

BayRS Version 12.20 provides the following new Site Manager and BCC features.

8021.Q Tagging

8021.Q virtual LAN (VLAN) tagging enables a router to connect VLANs in layer 2 VLAN environments, acting as a default router for VLANs performing a "one armed router" function, while continuing to deliver WAN connectivity and security/firewalling between domains. This is not an implementation of VLANs on the router. It only provides termination of VLANs on a router and does not extend the VLAN across the wide area.

802.1Q tagging supports only 100BASE-T and is implemented on ARN, ASN, and BN router platforms. For information about 802.1Q, see *Configuring Ethernet, FDDI, and Token Ring Services.*

ARN, ASN, and System 5000 Support

You can use the BCC to configure the ARN, ASN, and System 5000 router and all related hardware modules, except for the X.25 PAD module, FE1 adapter module, and V.34 console modem. You cannot use the BCC to configure the ARN/10/100-TX or the ARN 100-FX base units.

ATM Configuration

The following features are new for ATM in BayRS Version 12.20. For more information about ATM, see *Configuring ATM Services.*

ATM BCC Support

You can use BCC commands to configure PVC, classical IP, and LAN emulation service records. You can also use BCC commands to configure IP (PVC, classical IP, and LEC service records) or IPX (PVC and LEC service records only) over ATM.

MPOA Server Configuration

BayRS Version 12.20 supports MPOA server (MPS) configuration over ATM. Multi-Protocol Over ATM (MPOA) is the ATM Forum standard that specifies a way to efficiently transport intersubnet, unicast data in a LANE environment.

MPOA provides a direct connection between MPOA clients that reside on separate ELANs by allowing the LAN emulation clients to establish "cut-through" VCs that bypass the MPS.

MPOA also ensures interoperability with the existing infrastructure of routers. MPOA servers use routers that run standard network layer protocols, such as OSPF, providing a smooth integration with existing networks.

ATM Router Redundancy

BayRS Version 12.20 supports warm standby redundancy for ATM routers. This redundancy protects a network from the irrecoverable failure of an entire ATM router.

Router redundancy for ATM enables you to switch from a primary router connected to an ATM network to a secondary router connected to the same ATM network. The primary router is configured to be in a router redundancy (RR) group. One or more secondary routers are also configured to be members of the same RR group.

Next Hop Resolution Protocol for MPOA

The Next Hop Resolution Protocol (NHRP) resolves a layer 3 media-independent protocol address to a layer 2 media-dependent address. As implemented in BayRS Version 12.20, NHRP resolves layer 3 IP addresses and layer 2 ATM addresses. Specifically, NHRP works in conjunction with Multi-Protocol Over ATM (MPOA) clients and servers to provide a facilitated SVC-based delivery of IP datagrams over an ATM cloud.

Bay Dial VPN

Bay Dial Virtual Private Network (Dial VPN) services provide switched connectivity to virtual private networks (VPNs) based on Internet Engineering Task Force (IETF) specifications. Corporate customers can subscribe to this service for remote dial access to virtual private networks or to the Internet over telephone lines.

For information about configuring Bay Dial VPN, see *Configuring and Troubleshooting Bay Dial VPN Services.*

BCC show Commands

BCC **show** commands are available for all router platforms, hardware, and protocols supported by the BCC. For information about BCC **show** commands, see the appropriate protocol manual.

BGP Route Reflector

A BGP router configured for internal BGP (IBGP) must establish a peer-to-peer session with every other IBGP speaker in the AS. In an AS with a large number of IBGP speakers, this full-mesh topology can result in high bandwidth and maintenance costs. For example, a full-mesh topology for an AS with 50 IBGP speakers requires 1,225 internal peer-to-peer connections.

To avoid the high cost of a full-mesh topology to support IBGP speakers within a large AS, you can configure a router to function as an IBGP route reflector. An IBGP speaker that needs to communicate with other BGP speakers in the AS establishes a peer-to-peer *RR client* session with the IBGP route reflector.

For more information about BGP Route Reflector, see *Configuring IP Services*.

Cache Mode

Site Manager Version 6.20 provides a fourth configuration mode, *cache mode*, which is a hybrid of the existing remote and dynamic modes. Cache mode addresses the problem of long response times that may be encountered while configuring a router in dynamic mode, while still providing real-time configuration to the target router. For information about cache mode, see *Configuring and Managing Routers with Site Manager.*

Data Collection Module

You can now use the BCC to configure a data collection module (DCM) for RMON and RMON2 on an AN/ANH and ARN router. For information about configuring a DCM, see *Configuring RMON and RMON2.*

Dial Backup

You can now use the BCC to configure dial backup service. For more information about using the BCC to configure dial backup service, see *Configuring Dial Services.*

Equal-Cost Multipath IP Static Routes

IP supports equal-cost multipath (ECMP) static routes for traffic load balancing. If IP considers the ECMP routes to be the best routes, IP uses them in the way you specify -- in round-robin fashion, for example -- to forward data.

Frame Relay

You can use the BCC to configure frame relay on serial, HSSI, and MCT1/E1 modules. You can also use BCC commands to configure frame relay as a backup interface over dial services. Frame relay supports the AN, ARN, ASN, BN, and System 5000 platforms.

Generic Routing Encapsulation

Generic Routing Encapsulation (GRE), which is defined in RFCs 1701 and 1702, is a generalized protocol that defines a method for encapsulating any payload inside any network (layer 3) protocol. For BayRS Version 12.20, GRE allows the layer 3 protocol IP to be encapsulated in IP. GRE tunnels are manually configured on the routers. For the tunneled protocol, the tunnels will be viewed as a logical single-hop point-to-point link. Routing information for the tunneled protocol can be exchanged over GRE tunnels. For more information about GRE, see *Configuring IP Services*.

HTTP Web Server

You can use the BCC to configure the HTTP Web server. The router operating system contains an embedded Web server engine which, along with Web-based management pages, provides a simple, easy, and cost-effective way to monitor Bay Networks devices. For information about configuring the HTTP Server, see *Managing Your Network Using the HTTP Server.*

IBGP Equal-Cost Multipath

BGP equal-cost multipath (ECMP) support allows an IBGP speaker to perform route balancing within an AS by using multiple equal-cost routes submitted to the routing table by OSPF or RIP. For more information about IBGP equal-cost multipath, see *Configuring IP Multicasting and Multimedia Services.*

IGMP Relay

A router configured as an IGMP Relay (IGMP-R) device provides the following services on behalf of an MOSPF AS boundary router:

- Solicits multicast group membership information by sending IGMP host membership queries to hosts on its attached local networks
- Receives host membership reports and unsolicited join messages from hosts on attached networks and forwards them to the MOSPF boundary router
- Forwards multicast data to group members on locally attached networks

To an IGMP host on a directly attached network, the IGMP-R device appears to be a multicast router. The host receives a host membership query from IGMP-R and responds by sending an IGMP response. A host can also send IGMP-R an unsolicited join message.

To the MOSPF AS boundary router, the IGMP-R device appears to be a locally attached host. The MOSPF router (which also runs IGMP) sends IGMP host queries to the IGMP-R. IGMP-R responds by forwarding -- relaying -- IGMP host reports and unsolicited join messages from its attached hosts.

For more information about IGMP Relay, see *Configuring IP Multicasting and Multimedia Services.*

IP Adjacent Host Configuration

You can use the BCC to configure IP adjacent hosts on the BN, ASN, AN, ARN, and System 5000 platforms. For information about configuring IP adjacent hosts, see *Configuring IP Services*.

IPX Support

You can use the BCC to configure IPX on Ethernet, FDDI, serial, token ring, ATM, BRI, MCT/E1, and HSSI interfaces. For information about IPX, see *Configuring IPX Services*.

L2TP Configuration

The following features are new for L2TP in BayRS Version 12.20. For more information about L2TP, see *Configuring L2TP Services.*

Domain Name Removal Prior to RADIUS Authentication

In BayRS Version 12.20, there is a new feature for L2TP configuration that enables you to remove the domain name from the complete user name before RADIUS authentication takes place. By default, this feature is enabled; consequently, the LNS automatically removes the delimiter, which separates the user name and the domain name, and the entire domain name.

If your RADIUS server database includes domain names as part of the user name entries, you need to disable this feature. To do this, set the Remove Domain Name parameter to Disable.

RIP Support

For BayRS 12.20, the LNS now supports RIP. RIP is particularly useful when the remote host is a router, because it enables the LNS to learn routing information from the remote router.

Flow Control

For an L2TP session, you can enable flow control. Flow control manages congestion across the connection, ensures that packets are not lost, and makes sure the devices at each end of the connection are communicating properly.

L2TP IP Address Assignment

When configuring the LNS, you must configure an IP address for every slot that has an L2TP interface. This address is referred to as the *L2TP IP interface address*.

The L2TP IP interface address is internal to the LNS. When communicating with the remote user, the LNS associates the user's IP address, which is assigned by the RADIUS server, with the L2TP IP interface address that you configured.

Network Address Translation

NAT "N to 1" translation is a feature enhancement to Network Address Translation (NAT). "N to 1" address translation allows you to use a single IP address to represent a range of IP addresses on the private network. "N to 1" translations allow multiple hosts on the private network to be mapped to a single source address on the global or public side of the NAT. For more information about NAT III, see *Configuring IP Services*.

OSI Configuration

The following features are new for OSI in BayRS Version 12.20. For information about OSI configuration, see *Configuring OSI Services*.

OSI over ATM

OSI over ATM includes support for the following encapsulation methods: LLC/SNAP 1483 encapsulation and NLPID 1490 encapsulation.

With OSI over ATM, you also can configure *manual area addresses*. Manual area addresses are synonymous area addresses configured on the same intermediate system. You may want to configure manual area addresses when more than one addressing authority can assign addresses to the routing domain, or to allow a routing domain to be reconfigured during operation.

Note: The OSI Area Address Alias 1 and Area Address Alias 2 parameters, used in previous releases to configure manual area addresses, no longer exist.

TARP over OSI

The Transport Identifiers (TID) Address Resolution Protocol (TARP) has been added to the OSI suite for BayRS Version 12.20. OSI uses TARP to map OSI network service access point (NSAP) Level 3 addresses to target identifier (TID) addresses. It is similar to the DNS protocol that IP uses, where names are converted to IP addresses.

A TID is a name that applies to an entire router. It can be any text string, up to 40 characters long, and is similar to a UNIX host name. OSI addresses also apply to an entire router. An OSI NSAP address consists of the domain address, area address, the router ID, and a value called the N selector, which is always 00. It can be up to 13 bytes long.

Telnet Passthrough

Telnet Passthrough allows centrally located technical customer personnel to monitor, control, and effect change to the operation of Sentry UPS units. By integrating Telnet Passthrough traffic onto a router-based multiprotocol backbone network, you can reduce costs by eliminating extra asynchronous lines and equipment.

Requirements for access to devices other than Sentry alarm systems should be communicated to Router Product Management.

WAN Line Configuration

You can use BCC Version 4.00 to configure and customize line services for:

- Serial WAN circuits
- An internal DSU/CSU installed on a Bay Networks router
- Multichannel E1 (MCE1) or Multichannel T1 (MCT1) circuits
- Fractional T1 (FT1) circuits

For more information, see *Configuring WAN Line Services*.

New Features in BayRS Version 12.10

BayRS Version 12.10 provides the following new Site Manager and BCC features.

ATM Half Bridge

ATM Half Bridge (AHB) is a protocol operating on BLN and BCN routers. This protocol connects remote Ethernet hosts (PCs and workstations) attached via digital subscriber line (DSL) devices (modems) to an IP routed network. AHB supports a WAN infrastructure network by performing the bidirectional conversion of Ethernet bridged packets for IP routing to and from ISPs and corporate networks. For information about AHB, see *Configuring ATM Half-Bridge Services*.

DLSw/APPN Boundary

DLSw/APPN boundary allows DLSw to provide remote communications via an IP backbone. DLSw/APPN boundary provides access over this backbone from enterprise-level applications using an APPN/HPR network. For information about this feature, see *Configuring DLSw Services*.

Frame Relay PVC Pass Through

PVC pass through lets a single frame relay network access link carry both conventional network protocol traffic and otherwise unroutable frame relay access device (FRAD) traffic. It works with hybrid mode PVCs only. PVC pass through connects two PVCs on separate interfaces so that the router can transmit traffic it receives on one PVC out the other with no encapsulation requirements. For information about PVC pass through, see *Configuring Frame Relay Services*.

Frame Relay SVCs

SVCs over frame relay provide the advantage of “any-to-any” switched connectivity between clients, without requiring the use or configuration of permanent virtual circuits (PVCs).

Hi/fn Software Compression

Bay Networks Stac LZS data compression software, based on the Hi/fn Stac LZS algorithm, transports compressed packets across a PPP link. Stac LZS can detect whether packets are lost during transmission and will not retransmit data packets that are lost. For information about this feature, see *Configuring Data Compression Services*.

HTTP Web Server

The router operating system contains an embedded Web server engine which, along with Web-based management pages, provides a simple, easy, and cost-effective way to monitor Bay Networks devices. For information about the HTTP Web server, see *Managing Your Network Using the HTTP Server.*

IP Multicasting for DLSw

IP multicasting over DLSw supports RFC 2166 (Version 2.0) of the DLSw standard. This feature uses multicasting to support “any-to-any” peer configuration. For information about this feature, see *Configuring IP Multicasting and Multimedia Services.*

Layer 2 Tunneling Protocol (L2TP)

The Layer 2 Tunneling Protocol (L2TP) provides remote users, such as telecommuters, mobile professionals, and users in remote branch offices, with dial-in access to a corporate network. L2TP enables users to create a virtual private network, which uses the existing physical infrastructure of a public network, such as the Internet, but offers the security and exclusivity of a private network. L2TP is supported on the ASN and BN platforms. For information about L2TP, see *Configuring L2TP Services.*

QLLC Wildcard

This enhancement to QLLC address mapping reduces configuration work for certain network configurations. Wildcards work for LLC end stations that send data to QLLC hosts, and for QLLC end stations that send data to LLC hosts. You can configure a single end station-to-host map and apply it to any number of QLLC connections. For information about QLLC wildcards, see *Configuring X.25 Services*.

Redundant LES/BUS

LAN emulation server (LES) and broadcast and unknown server (BUS) redundancy reduces the risk of network failure by overcoming a single point of failure. This feature is now supported on the ATM routing engine (ARE). For information about this feature, see the *BayRS Version 12.10 Document Change Notice*.

RMON2

Remote monitoring Version 2 (RMON2) provides statistics on network and application layer traffic (layers 3 through 7 of the OSI model). By monitoring at the higher-layer protocols, you can obtain an internetwork or enterprise-wide view of network traffic. For information about RMON2, see *Configuring RMON and RMON2*.

RMON Alarms and Events

RMON alarms and events are MIB groups supported on all Bay Networks routers. The alarm group lets you set an alarm threshold and sampling interval to enable the RMON agent to generate alarms on any network segment it monitors. The event group lets you generate an SNMP trap, log entry, or both for any event you choose. For information about RMON alarm and event groups, see *Configuring RMON and RMON2*.

WAN Compression Protocol (WCP) and Priority Queuing over Multilink PPP

In BayRS Version 12.10, WCP and priority queuing allows negotiation one layer above PPP multilink. Negotiation above the multilink bundle improves load balancing. For priority queuing this feature improves the resequencing of packets. This feature also allows for compatibility with the Nautica® product line.

For more information about this feature, see *Configuring Data Compression Services*.

X.25 PAD Software Support

BayRS Version 12.10 provides configuration and management support for the new X.25 packet assembler/disassembler (PAD). For information about the hardware portion of this product, see the next section, "New Hardware for BayRS 12.20." For information about X.25 PAD software, see *Configuring X.25 Services*.

New Hardware for BayRS 13.00

BayRS Version 13.00 supports hardware available in previous releases. In this section, you can read about new hardware introduced with BayRS Version 12.20 and BayRS Version 12.10.

New Hardware for BayRS 12.20

BayRS Version 12.20 supports the following new hardware.

FE1/E1 WAN Adapter Module

The FE1/E1 WAN adapter module works with Bay Networks AN, ANH, and ARN routers. It operates like a T1 CSU/DSU for E1 circuits. This adapter has an X.21 or V.35 serial interface through which it connects to the router and a G.703/G.704 interface through which it connects to the network.

To use the FE1/E1 WAN adapter module on the AN, ANH, or ARN router, you must upgrade the boot and diagnostic PROMs. For a complete list of boot and diagnostic PROMs for BayRS Version 12.20, see *Upgrading Routers to BayRS Version 13.xx*.

For more information about configuring the FE1/E1 WAN adapter module, see *Configuring WAN Line Services.*

FRE-2-060E Processor Module with Advanced Compression Coprocessor Daughterboard

The FRE-2-060E processor module is equipped with the advanced compression coprocessor daughterboard. Although it is interoperable with existing software-based compression services, the advanced compression coprocessor daughterboard performs all compression, decompression, and compression-related functions in hardware, so that the FRE-2-060E processor does not need to perform them.

This new hardware configuration for BN platforms offers a choice of hardware compression algorithms that interoperates with FRE-3, FRE-2-060, FRE-2-040, and FRE processors and all LMI- and PCI-based link modules.

The FRE-2-060E with advanced compression coprocessor daughterboard supports hardware data compression over the following WAN interfaces:

- Multichannel E1-II (MCE1-II)
- Dual Multichannel E1 (DMCE1-II)
- Multichannel T1 (MCT1)
- Dual Multichannel T1 (DMCT1)
- Quad Multichannel T1 (QMCT1)
- Octal Synchronous (OSync)
- Quad Synchronous (QSync)
- Ethernet Synchronous Advanced Filter (ESAF)

The FRE-2-060E with advanced compression coprocessor daughterboard supports MSA compression for the following WAN protocols on BN platforms:

- Frame relay
- PPP
- ISDN PRI

The FRE-2-060E with advanced compression coprocessor daughterboard supports Hi/fn LZS compression for the following WAN protocols on BN platforms:

- PPP
- ISDN PRI

For information about configuring the FRE-2-060E with advanced compression coprocessor daughterboard, see *Configuring Data Compression Services*.

New Hardware for BayRS 12.10

BayRS Version 12.10 supports the following new hardware.

Model 5782 ATM Virtual Network Router (VNR)

The Model 5782 ATM VNR extends the Bay Networks ATM VNR capability to the Model 5000BH ATM switching platform. The Model 5000BH chassis supports up to four VNRs (two per Centillion ATM bus). For information about the Model 5782 VNR, see *Using the Model 5782 ATM Virtual Network Router.*

Using the Model 5782 VNR requires an MCP configured with SpeedView™ 3.0 for Windows. For additional information about how to configure an MCP switch module, see *Using SpeedView 3.0 for Windows.*

Fractional T1 DSU/CSU WAN Adapter Module

Fractional T1 (FT1) DSU/CSU is a new WAN adapter module for the ARN, AN, and ANH router platforms. For information about the FT1 adapter module on an ARN platform, see *Installing and Operating BayStack ARN Routers*. For information about the FT1 adapter module on AN and ANH platforms, see *Installing and Operating BayStack AN and ANH Routers.* Also see the *Installing the FT1/T1 DSU/CSU Upgrade Kit*. For information about how to configure FT1, see *Configuring WAN Line Services.*

ARN 10/100 Mb Ethernet

The new 10BASE-T/100BASE-T Mb Ethernet base module for the ARN platform provides autosense 10/100 Ethernet connectivity at full-duplex operation. The new 100BASE-FX Ethernet base module supports 100 Mb full-duplex operation. For information about how to install and use this module on an ARN platform, see *Installing and Operating BayStack ARN Routers.*

X.25 PAD

The X.25 packet assembler/disassembler (PAD) provides access to an X.25 service for devices that are not capable of loading or unloading data packets or are not able to send and receive packets across an X.25 interface. The X.25 PAD hardware comprises an 8-port asynchronous communications controller in the form of a serial adapter module for the router. For information about the X.25 PAD module, see *Installing and Operating BayStack AN and ANH Routers* and *Installing the X.25 PAD Hardware Upgrade*.

Guidelines for Working with BayRS Version 13.00

Note the following guidelines when using BayRS Version 13.00. These guidelines supplement the instructions in the Version 13.00 documentation set.

AN/ANH and ARN Guidelines

Note the following operational guidelines when using AN, ANH, or ARN routers.

Allocating Memory on ARN Routers

Although you can change the default memory allocation on other Bay Networks router platforms, the ARN platform does not support this “buffer carving” feature.

On the ARN, Site Manager does not support the Admin > Kernel Configuration option, and the Technician Interface does not support the **set** command for wfKernCfgParamEntry objects. Attempting to set wfKernCfgParamGlobMem on the ARN results in a warning message.

Cycling Power to the ARN

To ensure a complete power cycle, Bay Networks recommends that you wait at least 4 seconds after turning off the ARN before turning it back on.

Caution: Cycling power to the ARN too quickly could cause an error.

DSU/CSU Test LED Remains On After Reset

The ARN DSU/CSU Test LED properly goes on when the interface enters test or loopback mode. However, the LED remains on after resetting the DSU/CSU module, even though all looping terminates and the module hardware resets.

Restarting the router turns the LED off. However, this action is not necessary for proper operation of the DSU/CSU interface.

Network Booting on DSU/CSU Interfaces

AN and ANH DSU/CSU interfaces do not support network booting in BayRS Version 13.00. The ARN DSU/CSU supports network booting only over interfaces configured for 64 Kb/s Clear Channel service.

ARN Router Not a Supported DVS RADIUS Client

The ARN router is not a supported DVS RADIUS client.

BayRS Version 13.00 Flash Memory Requirements

BayRS Version 13.00 software ships on the following flash memory cards:

Platform	Flash Memory Required	Associated Software Suites
AN/ANH	8 or 16 MB	corp_suite, ip_access, office_suite
ARN	8 or 16 MB	corp_suite, ip_access, office_suite
ASN	8 or 16 MB	corp_suite, lan_suite, office_suite, system_suite, wan_suite
BN	8 or 16 MB	atm, corp_suite, lan_suite, system_suite, vnr_suite, wan_suite
System 5000	8 or 16 MB	corp_suite, lan_suite, system_suite, vnr_suite, wan_suite

Creating Multiple GRE Tunnels

When creating multiple GRE tunnels dynamically, you can configure a maximum of 5 point-to-point GRE tunnels. In multipoint configurations, you can configure 64 GRE tunnels per interface.

DNS Not Operational

Configuring IP Utilities provides information about the Domain Name System (DNS) client and how to configure it using Site Manager. Please disregard this information; DNS is not operational, and cannot be configured using Site Manager.

Editing Line Resources for FT1 Services

The following information is missing from *Configuring WAN Line Services*.

If you run ST2 traffic on this logical line, you can reserve bandwidth for this type of traffic. To do so, specify Edit for the Line Resources parameter in Site Manager, which provides access to the Resource Manager.

Parameter:	**Line Resources**
Path:	Configured **FT1** Connector > Adapter Module FT1 Logical Lines
Default:	Edit
Options:	Edit
Function:	Provides access to the Edit Line Resources window to manage reservable bandwidth for ST2 traffic.
Instructions:	Select the parameter and click on Values. The Edit Connector window appears. Click on Edit Line Resources to access the Resource Manager.
MIB Object ID:	None

FT1/T1 DSU/CSU Guidelines

Note the following operational guidelines when using the FT1/T1 DSU/CSU.

Allocating DS0s

If you have an FT1/T1 DSU/CSU or E1 module and an ISDN S/T or U module installed on the same ARN, you can alternate assigned DS0 channels with unassigned channels, up to a maximum rate of 512 Kb/s (8 channels).

Caution: You cannot alternate assigned and unassigned channels across the 24 channels in a T1 line (768 Kb/s).

If you have rates above 512 Kb/s, Bay Networks recommends that you configure the DS0s contiguously, even though some noncontiguous channel configurations may work. If you have an unsupported channel configuration, the following message appears in the event log:

```
Connector COM <COM#>, Current timeslot assignment is not supported.
```

This message indicates an invalid assignment of DS0s for the specified connector; you should have your service provider change the T1 channel assignments. Using contiguous channel assignments addresses this problem.

FT1/T1 and ISDN Phone Line Configuration

If you configure FT1/T1 after configuring an ISDN ST or U interface, you may experience line manager faults if you have a 2B+D channel (one physical RJ-45 cable with two phone circuits) with only one phone line configured. To avoid any line manager faults, configure both phone lines.

Selecting 56K Rate Adaption on FT1/T1 DSU/CSU Lines

Rate adaption determines the number of bits and their bit positions within a time slot. The FT1/T1 logical line rate adaption is 64 Kb/s per DS0. You cannot change this rate.

Hi/fn (Stac) LZS Compression Executable

Using Hi/fn™ (Stac) LZS data compression requires the purchase of a separate CD containing the Hi/fn LZS executable for BayRS Version 13.00 software. You must purchase this CD regardless of whether you plan to implement compression in hardware or software.

IP Fragmentation Not Supported over GRE Tunnels

IP packets will not be fragmented when encapsulated at the tunnel ingress point. If necessary, you can set MTU sizes to values large enough to prevent fragmentation on relevant interfaces on the GRE tunnel ingress router. Alternatively, you can configure your system to send MTU sizes less than the MTU sizes of the relevant interfaces on the GRE tunnel ingress router.

NAT Anomalies

NAT exhibits the following anomalies in BayRS 13.00.

Configuring NAT Dynamically

When you are configuring a local or global interface for NAT in dynamic mode, the router returns an SNMP set error. However, this error does not affect the configuration of the router.

NAT Interfaces

Configuring IP Services states that NAT is supported over all interfaces. However, NAT is not currently supported over ATM or X.25 interfaces using Site Manager Version 7.00.

Deleting NAT from a Router

If you delete NAT from a router, all previously configured instances of static entries will remain in the router MIB. You can delete the instances with the Technician Interface.

Outbound LAN Traffic Filters

When implementing outbound traffic filters for LAN protocols, note that in some configurations the filters may cause a decline in throughput performance. For LAN circuits where the forwarding rate of the router is critical, you should monitor the throughput performance after configuring outbound LAN filters. If you notice an unacceptable performance degradation, try using inbound traffic filters.

Protocol Prioritization No Call Filters and TCP Applications

Using a no call filter that applies to any TCP application can cause TCP to retransmit the filtered packet.

When two routers running a TCP application are connected using a demand line, and the demand line becomes inactive, the TCP application remains inactive.

If a demand line configured with a no call filter goes down, the no call filter drops any TCP packets it receives. Because TCP never receives an acknowledgment for transmitting its packets, the TCP application continues to retransmit packets until the connection eventually times out and the application stops operating.

Note: No call filters are specific to dial services. For additional information about traffic filters and protocol prioritization, see *Configuring Traffic Filters and Protocol Prioritization*.

Support for Strata-Flash Card

BayRS Version 13.00 supports the Strata-Flash card on AN, ANH, ARN and BN routers. For full details about flash cards that BayRS 13.00 supports, see “Flash Memory Cards Supported” on page 42.

X.25 PVCs

BayRS Version 13.00 software supports X.25 PVCs for X.25 IPEX Gateway services only.

Operating Limitations

Be aware of the following limitations when using BayRS 13.00.

Restriction When Deleting ATM from a Router if Signaling Is Enabled

Do not delete ATM from a router if you enabled signaling on an ATM circuit. Otherwise, Site Manager, the BCC, or the Technician Interface will restart after a couple of minutes.

Restriction if Signal Ports Settings on a Switch and Router Conflict

If you are using a switch with signal ports set to V3.1, be sure to set the signaling setting on the router to V3.1. If you accept the default setting of V3.0 for the router, the router will fault repeatedly until you change the setting to V3.1.

Restriction When Creating FTP from the BCC

From the BCC, if you create FTP on the router, then delete it and recreate it, the BCC will fault. In this case, you must restart the BCC, and create FTP on the router again.

Restriction When Deleting a Hybrid Mode Permanent Virtual Circuit (PVC)

If you configure SRB on a router, do not delete hybrid mode PVCs. Otherwise, all slots will restart.

Restriction When Using DLSw/APPN Boundary Port with AS400s and Other Adjacent Link Stations

Do not configure any explicit APPN Adjacent Link Stations on the DLSw/APPN Boundary (VCCT) port, unless you are certain that the adjacent link station (for example, an AS400) will not attempt to connect to the APPN node. Otherwise, the DLSw/APPN Boundary (VCCT) function will fail to operate correctly and the router may restart.

Restriction When Using Show atm line phy Command Options

The **show atm line phy** command has just one option for Release 13.00:

show atm line phy errors

If you try to enter **show atm line phy config** (which was available in 12.20), the BCC displays an error message, as follows:

```
bcc> show atm line phy config
show atm line phy does not allow config as a subcommand.
```

To obtain ATM PHY configuration data, load the script *atm.bat* on the device memory card, and then enter the following command:

```
bcc> tic show atm line phy
```

Restriction When Virtual Channel Connections (VCCs) Become Inactive

On the ARE and 5782 MPE, BayRS 13.00 does not allow the release virtual channel connections when they time out. To maintain availability of VCCs for new activities, configure a LAN emulation client (LEC) other than the router to release the inactive VCCs.

Protocols Supported

BayRS Version 13.00 supports the following bridging/routing protocols and router configuration features:

- Advanced Peer-to-Peer Networking (APPN)
- AppleTalk and AppleTalk Update Routing Protocol (AURP)
- Asynchronous transfer mode (ATM)
- ATM Data Exchange Interface (ATM DXI)
- ATM Half Bridge (AHB)
- ATM LAN Emulation (802.3 and 802.5)
- Bandwidth Allocation Protocol (BAP)
- Binary Synchronous Communication Type 3 (BSC3)
- Bisync over TCP (BOT)
- Bootstrap Protocol (BootP)
- Border Gateway Protocol (BGP-3 and BGP-4)
- Classless interdomain routing (CIDR)
- Data compression (WCP and Hi/fn)
- Data link switching (DLSw)
- DECnet Phase IV
- Distance Vector Multicast Routing Protocol (DVMRP)
- Dynamic Host Configuration Protocol (DHCP)
- Encryption (WEP; proprietary)
- Exterior Gateway Protocol-2 (EGP-2)

- File Transfer Protocol (FTP)
- Frame relay (PVC, SVC)
- HP Probe
- Integrated Services Digital Network (ISDN)
- Interface redundancy (proprietary)
- Internet Control Message Protocol (ICMP)
- Internet Gateway Management Protocol (IGMP)
- Internet Packet Exchange (IPX)
- Internet Protocol (IP)
- Internet Protocol Version 6 (IPv6)
- IPv6 PPP Control Protocol (CP)
- Internet Stream Protocol (ST2)
- Layer 2 Tunneling Protocol (L2TP)
- Learning Bridge
- Logical Link Control 2 (LLC2)
- Multi-Protocol over ATM (MPOA)
- Multicast OSPF (MOSPF)
- Native Mode LAN (NML)
- Network Core
- Network Time Protocol (NTP)
- Open Shortest Path First (OSPF)
- Open Systems Interconnection (OSI)
- Point-to-Point Protocol (PPP)
- Polled Asynch (PAS), also called Asynch Passthru over TCP
- Protocol prioritization
- Qualified Logical Link Control (QLLC)
- RaiseDTR dialup
- Remote Authentication Dial-In User Service (RADIUS)

- Resource Reservation Protocol (RSVP)
- Router discovery
- Router redundancy (proprietary)
- Routing Information Protocol (RIP)
- Service Advertisement Protocol (SAP)
- Simple Network Management Protocol (SNMP)
- Source Routing Bridge
- Source Routing Bridge over ATM permanent virtual circuits (PVCs)
- Spanning Tree
- Switched Multimegabit Data Service (SMDS)
- Synchronous Data Link Control (SDLC)
- Telnet (inbound and outbound)
- Transmission Control Protocol (TCP)
- Transparent Bridge
- Transparent-to-Source Routing Translation Bridge
- Trivial File Transfer Protocol (TFTP)
- User Datagram Protocol (UDP)
- V.25bis dialup
- Virtual Network Systems (VINES)
- X.25 with QLLC
- Xerox Network System (XNS)
- XMODEM and YMODEM

Standards Supported

Table 6 lists the Request For Comments (RFCs) and other standards documents with which Version 13.00 complies. BayRS Version 13.00 may support additional standards that are not listed in this table.

Table 6. Standards Supported by Version 13.00

Standard	Description
ANSI T1.107b-1991	Digital Hierarchy - Supplement to formats specifications
ANSI T1.404	DS3 Metallic Interface Specification
ANSI X3t9.5	Fiber Distributed Data Interface (FDDI)
Bellcore FR-440	Transport Systems Generic Requirements (TSGR)
Bellcore TR-TSY-000009	Asynchronous Digital Multiplexes, Requirements and Objectives
Bellcore TR-TSY-000010	Synchronous DS3 Add-Drop Multiplex (ADM 3/X) Requirements and Objectives
IEEE 802.1	Logical Link Control (LLC)
IEEE 802.1Q	IEEE 802.1Q VLAN tagging
IEEE 802.3	Carrier Sense Multiple Access with Collision Detection (CSMA/CD)
IEEE 802.5	Token Ring Access Method and Physical Layer Specifications
IEEE 802.10	Bridge with Spanning Tree
ITU Q.921	ISDN Layer 2 Specification
ITU Q.931	ISDN Layer 3 Specification
ITU X.25	Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuits
RFC 768	User Datagram Protocol (UDP)
RFC 791	Internet Protocol (IP)
RFC 792	Internet Control Message Protocol (ICMP)
RFC 793	Transmission Control Protocol (TCP)
RFC 813	Window and Acknowledgment Strategy in TCP
RFC 826	Ethernet Address Resolution Protocol
RFC 827	Exterior Gateway Protocol (EGP)

(continued)

Table 6. Standards Supported by Version 13.00 *(continued)*

Standard	Description
RFC 854	Telnet Protocol Specification
RFC 855	Telnet Option Specification
RFC 856	Telnet Binary Transmission
RFC 857	Telnet Echo Option
RFC 858	Telnet Suppress Go Ahead Option
RFC 859	Telnet Status Option
RFC 860	Telnet Timing Mark Option
RFC 861	Telnet Extended Options: List Option
RFC 863	Discard Protocol
RFC 877	Transmission of IP Datagrams over Public Data Networks
RFC 879	TCP Maximum Segment Size and Related Topics
RFC 888	"STUB" Exterior Gateway Protocol
RFC 894	Transmission of IP Datagrams over Ethernet Networks
RFC 896	Congestion Control in IP/TCP Internetworks
RFC 903	Reverse Address Resolution Protocol
RFC 904	Exterior Gateway Protocol Formal Specification
RFC 919	Broadcasting Internet Datagrams
RFC 922	Broadcasting Internet Datagrams in Subnets
RFC 925	Multi-LAN Address Resolution
RFC 950	Internet Standard Subnetting Procedure
RFC 951	Bootstrap Protocol
RFC 959	File Transfer Protocol
RFC 994	Protocol for Providing the Connectionless-mode Network Service
RFC 1009	Requirements for Internet Gateways
RFC 1027	Using ARP to Implement Transparent Subnet Gateways
RFC 1042	Transmission of IP over IEEE/802 Networks
RFC 1058	Routing Information Protocol
RFC 1075	Distance Vector Multicast Routing Protocol (DVMRP)
RFC 1076	Redefinition of Managed Objects for IEEE 802.3 Repeater Devices (AN hubs only)

(continued)

Table 6. Standards Supported by Version 13.00 *(continued)*

Standard	Description
RFC 1079	Telnet Terminal Speed Option
RFC 1084	BOOTP Vendor Information Extensions
RFC 1091	Telnet Terminal-Type Option
RFC 1108	Security Options for the Internet Protocol
RFC 1112	Host Extensions for IP Multicasting Appendix I. Internet Group Management Protocol
RFC 1116	Telnet Line-mode Option
RFC 1139	Echo Function for ISO 8473
RFC 1155	Structure and Identification of Management Information for TCP/IP-based Internets
RFC 1157	Simple Network Management Protocol (SNMP)
RFC 1163	BGP-2 (obsoleted by RFC 1267)
RFC 1164	Application of BGP in the Internet
RFC 1166	Internet Numbers
RFC 1188	Proposed Standard for the Transmission of IP over FDDI
RFC 1191	Path MTU Discovery
RFC 1209	Transmission of IP Datagrams over SMDS
RFC 1212	Concise MIB Definitions
RFC 1213	MIB for Network Management of TCP/IP-based Internets
RFC 1267	Border Gateway Protocol 3 (BGP-3; obsoletes RFC 1163)
RFC 1293	Inverse ARP for Frame Relay
RFC 1294	Multiprotocol Interconnect over Frame Relay (obsoleted by RFC 1490)
RFC 1304	Definition of Managed Objects for the SIP Interface Type
RFC 1305	Network Time Protocol
RFC 1315	Management Information Base for Frame Relay DTEs
RFC 1323	TCP Extensions for High Performance
RFC 1331	Point-to-Point Protocol (PPP; obsoleted by RFC 1661)
RFC 1332	PPP Internet Protocol Control Protocol (IPCP)
RFC 1333	PPP Link Quality Monitoring (obsoleted by RFC 1989)

(continued)

Table 6. Standards Supported by Version 13.00 *(continued)*

Standard	Description
RFC 1334	PPP Authentication Protocols
RFC 1350	The TFTP Protocol (Revision 2)
RFC 1356	Multiprotocol Interconnect on X.25 and ISDN in the Packet Mode
RFC 1376	PPP DECnet Phase IV Control Protocol (DNCP)
RFC 1377	OSI over PPP
RFC 1378	PPP AppleTalk Control Protocol (ATCP)
RFC 1390	Transmission of IP and ARP over FDDI Networks
RFC 1403	BGP OSPF Interaction
RFC 1434	Data Link Switching: Switch-to-Switch Protocol
RFC 1483	Multiprotocol Encapsulation over ATM AAL5
RFC 1490	Multiprotocol Interconnect over Frame Relay (obsoletes RFC 1294)
RFC 1552	The PPP Internetwork Packet Exchange Control Protocol (IPXCP)
RFC 1577	Classical IP and ARP over ATM
RFC 1583	OSPF Version 2
RFC 1585	MOSPF: Analysis and Experience
RFC 1634	Novell IPX over Various WAN Media (IPXWAN)
RFC 1638	PPP Bridging Control Protocol (BCP)
RFC 1654	Border Gateway Protocol 4 (BGP-4; obsoleted by RFC 1771)
RFC 1661	Point-to-Point Protocol (PPP; obsoletes RFC 1331)
RFC 1662	PPP in HDLC-like Framing
RFC 1717	PPP Multilink Protocol (MP; obsoleted by RFC 1990)
RFC 1755	Signaling Support for IP over ATM
RFC 1757	Remote Network Monitoring Management Information Base (RMON), for AN, ANH, and ARN equipped with data collection module only
RFC 1762	PPP Banyan VINES Control Protocol (BVCP)
RFC 1763	PPP DECnet Phase IV Control Protocol (DNCP)
RFC 1764	PPP XNS IDP Control Protocol (XNSCP)
RFC 1771	Border Gateway Protocol 4 (BGP-4; obsoletes RFC 1654)
RFC 1795	Data Link Switching: Switch-to-Switch Protocol, Version 1
RFC 1819	Internet Stream Protocol, Version 2

(continued)

Table 6. Standards Supported by Version 13.00 *(continued)*

Standard	Description
RFC 1989	PPP Link Quality Monitoring (obsoletes RFC 1333)
RFC 1990	PPP Multilink Protocol (MP; obsoletes RFC 1717)
RFC 2138	Remote Authentication Dial In User Service (RADIUS)
RFC 2139	RADIUS Accounting
RFC 2166	Data Link Switching, Version 2.0, Enhancements
RFC 2205	Resource ReSerVation Protocol (RSVP) -- Version 1 Functional Specification
VINES 4.11	BayRS works with the Banyan VINES 4.11 standard. BayRS Version 8.10 (and later) also supports VINES 5.50 sequenced routing.

Flash Memory Cards Supported

You use Personal Computer Memory Card International Association (PCMCIA) flash memory cards to store the software image and the configuration files in Bay Networks routers. Software images for BayRS13.00 require 8 or 16 MB flash cards; however, you can store configuration files on 4 MB flash cards.

Table 7 lists the flash memory cards approved for use.

Table 7. Approved Flash Memory Cards

Size	Vendor	Part Number
4 MB	Advanced Micro Devices (AMD)	AMC004CFLKA-150
	AMP	797262-3
		797263-2
	Centennial	FL04M-20-11119
		FL04M-20-11138
	Epson	HWB401BNX2
	IBM	IBM1700400D1DA-25
	Intel	IMC004FLSAQ1381

(continued)

Table 7. Approved Flash Memory Cards *(continued)*

Size	Vendor	Part Number
8 MB	AMD	AMC008CFLKA-150
		AMC008CFLKA-200
		AMC008CFLKA-250
		AMC008DFLKA-150
		AMC008DFLKA-200
		AMC008DFLKA-250
	Centennial	FL08M-25-11119-01
		FL08M-15-11119-01
		FL08M-20-11138
		FL08M-20-11119-01
	Epson	HWB801BNX0
	Intel	IMC008FLSP/Q1422
	Centenniel (Strata-Flash)	FL08-20-11736-J5-61
16 MB	Epson	HWB161BNX2
	Centenniel (Strata-Flash)	FL16-20-11736-J5-61