Broadband Services Router 1000

The Broadband Services Router 1000 (BSR 1000™) from **RiverDelta™ Networks** is a compact, cost-effective solution for smaller distribution hubs or for larger sites in the earlier stages of broadband service market penetration. It is deployed as a standalone unit or in small clusters to cost-effectively extend cable infrastructure to additional subscribers. This easy-to-use, distributed Cable Modem Termination System (CMTS) helps carriers develop a competitive edge in defining, deploying, and managing broadband services.

It implements the RiverDelta Networks SmartFlow™ per-flow processing to cost-effectively extend the rich Quality of Service (QoS) support required to deliver multiple services. The space-saving BSR 1000 has an extremely compact footprint, making it ideal for small distribution hubs. It can be installed by non-technical personnel to extend the service area, and it can operate as a Layer 2 bridge or as a CMTS router with enhanced security features.

Traffic flows from multiple BSR 1000s can be aggregated by the carrier-class BSR 64000 at the regional headend to bring robust traffic management to a distributed environment. The BSR 1000 changes the value proposition for small distribution hubs by offering the most compact CMTS solution in the industry that can be installed in minutes to enable the cost-effective delivery of voice, data, and multimedia content and services.

...bringing carrier class-solutions for delivering voice, data, and video services to the broadband network marketplace.

Highlights: BSR 1000

- Compact, space-saving 1U platform that can be installed in minutes by non-technical personnel
- Fully compatible with the carrier-class BSR 64000
- Based on open systems standards, including DOCSIS 1.1 and PacketCable 1.0

- Supports 16,000 cable flows
- SmartFlow QoS classification for thousands of flows at wire speed with guaranteed SLAs
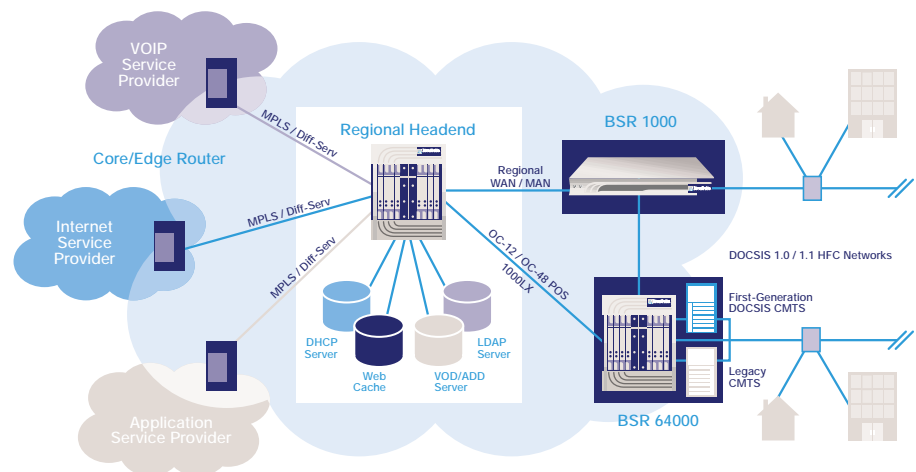- Flexible management and streamlined service provisioning

The BSR 1000 is the

industry's most compact

multiservice solution

for extending cable

access to small

distribution hubs.

It leverages SmartFlow

per-flow processing

to allow providers to

develop multiple

revenue streams from

HFC infrastructure

A Next-Generation Distributed Platform

The BSR 1000 is based on Data Over Cable Service Interface Specification (DOCSIS) 1.0, DOCSIS 1.1, and PacketCable 1.0 standards. This compact CMTS is configured with a single Fast Ethernet uplink to connect to a local data network or with an optional dual uplink with optical Gigabit or Fast Ethernet interfaces to enable connectivity to an optical ring and support daisy chaining. The BSR 1000 has a space-saving 1U "pizza box" chassis to allow Multiple System Operators (MSOs) to deploy broadband services infrastructure in the smallest locations where real estate is at a premium.

When aggregated into the carrier-class BSR 64000, the system delivers the isolation, policing, and address management needed to implement measurable SLAs. This solution allows cost-effective expansion of the service area and it delivers the traffic shaping needed to enable end-to-end Service Level Agreements (SLAs) across Hybrid Fiber Coax (HFC) infrastructure.

Distributed QoS and Multiservice Support

Broadband cable networks deliver the capacity required for converged, data, voice, and multimedia services, and the BSR 1000 is a flexible platform for enabling these next-generation services at the IP level. When used as a feeder into the BSR 64000, the BSR 1000 provides broad multiservice support and allows operators to swiftly generate incremental revenue streams from innovative new services.

The BSR 1000 allows cable operators to support multiple services from a single provider. They can also allow multiple providers to each deliver multiple services. Operators can deliver measurable QoS from the cable modem to the backbone networks of multiple service providers. By aggregating flows from multiple BSR 1000s into a BSR 64000 in the regional headend, operators can provide cost-effective cable access while ensuring content-aware routing.

SmartFlow
Granular QoS

Broadband
System Flow

Service Provider
Flow

Subscriber
Flow

Application
Flow
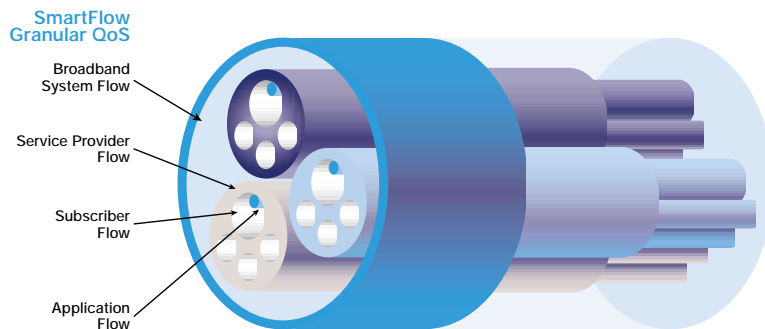
SmartFlow allows operators to classify packets into flows based on packet content and provide the appropriate QoS treatment for each flow using DOCSIS 1.1 for the HFC network and Diff-Serv or Multiprotocol Label Switching (MPLS) for the regional and core networks. Treatments for QoS—such as Diff-Serv Type of Service (TOS) remapping—are based on the policy defined by each service provider. The BSR family provides the customized statistics collection and per-provider provisioning needed to ensure and document the flexible delivery of services over a common cable network infrastructure.

Extended Security

Operators can deploy the BSR 1000 to serve as a self-configuring CMTS router or as a Layer 2 CMTS. When deployed as a secure, self-configuring Layer 2 CMTS, the BSR 1000 can isolate the Media Access Control (MAC) domains of the cable modems and prevent any attempts by cable modem users to bypass default gateways. This allows operators to bind MAC addresses to Internet Service Providers (ISPs) in open access applications, or to restrict access to premium content for only authorized subscribers. Only trusted modems are allowed access to HFC resources. If the MAC address of a cable modem is not recognized, the BSR 1000 will refuse network access or redirect the session to a self-provisioning server. In addition, when operating in routing mode, the BSR 1000 supports Proxy Address Resolution Protocol (ARP) to map cable modem IP addresses.

Network Management and Control

The BSR 1000 offers several options for management, control, and administration. In distribution hubs with limited availability of trained staff, troubleshooting on the BSR 1000 is simple—with easy-to-read diagnostic LEDs as well as remote management capability to support provisioning, configuration and problem identification. Partitioned management allows each service provider to view its own network management environment to control its service over the HFC network. The BSR 1000 supports Simple Network Management Protocol (SNMP) v1 and v3. RiverDelta supports all appropriate standard MIBs and offers custom MIBs to monitor and control the BSR 1000's value-added features.

The system supports the File Transfer Protocol (FTP) for bulk data transfer, and it can be seamlessly integrated into the existing network management infrastructure. The BSR 1000 also offers a Cisco-compatible Command Line Interface (CLI) for ease-of-use and interoperability with legacy infrastructure. The CLI supports full scripting capability, and ASCII-formatted command files can be uploaded, downloaded, and executed.

Automated Subscriber Management

The BSR Subscriber Management and Provisioning System is a powerful service creation and provisioning system aimed at operators looking for rapid definition and deployment of highly customized IP services to millions of subscribers. It is linked to a BSR 64000 at the regional headend and provides subscriber management across both the BSR 64000 and the distributed BSR 1000 platforms. The BSR Subscriber Management and Provisioning System is a scalable open access software solution for facilitating and managing competitive access to the broadband cable networks.

Operators can create QoS policies and service profiles that can be applied to a subscriber or groups of subscribers, and they can simplify provisioning and rapidly add new customers. Subscriber management features are based on open systems interfaces and allow MSOs to establish and enforce policies for service usage on a per-subscriber basis.

Cable operators can integrate the BSR family seamlessly with existing Operational Support Systems (OSS) infrastructure used for billing and customer care. It facilitates integration with existing OSS and billing systems through open interfaces, including CORBA and Lightweight Directory Access Protocol (LDAP). The system also supports exchange of subscriber, QoS, and service data through the eXtensible Markup Language (XML).

Flexible metering services can be provided to allow various billing methods. Operators can carefully track utilization and accurately generate invoices to maximize revenue from both subscribers and service provider partners. Operators can create profiles for each user and even allow them to self-provision services through a Web-based interface. MSOs can interoperate with Domain Naming System (DNS) servers, Dynamic Host Configuration Protocol (DHCP) servers, and other Web servers as well as billing and accounting applications. The Subscriber Management and Provisioning System communicates with directories that store service profiles and QoS policies as well as subscriber and provider information to enable interoperability with legacy systems.

Specifications: BSR 1000

Compact, Distributed CMTS

- Form Factor: 1U "Pizza Box"
- Height: 1.75 in; 4.45 cm
- Width: 19 in; 48.3 cm
- Depth: 16.75 in; 42.5 cm
- Fully configured weight: 9.8 lbs; 5.4 kg
- VxWorks Real-Time Operating System
- Power: 90-260 volts, 47-63 Hz
- Operating temperature: -5 to 50° C
- Non-operating temperature: -25 to 70° C
- Operating humidity: 10-90 percent, non-condensing
- Non-operating humidity, 5-95 percent, non-condensing

Network Interfaces

- Single Fast Ethernet
- Optional dual optical Fast or Gigabit Ethernet

Network Management and Provisioning

- Cisco-compatible CLI
- SNMP v1 and v3
- Standard DOCSIS and IETF MIBs
- RiverDelta MIBs
- LDAP v3
- COPS client
- Open interfaces to provisioning, accounting, and billing applications
- HTTP/Java/XML integration
- DHCP Relay

- Multiple levels of account/password authentication
- Telnet with security extensions
- Multiple community strings

Full RF Spectrum Support

- 4 upstream DOCSIS receivers
- Upstream modulation . . . . . .QPSK and 16 QAM
- Upstream per-channel bit rate. . .0.320 ~ 10.24 Mbps
- Upstream input frequency range . . .5 ~ 42 MHz
- Downstream DOCSIS transmitter
- Integrated up converter for RF output
- Downstream modulation . . . . . .64 QAM and 256 QAM
- Downstream output frequency range . . . . .88 ~ 857 MHz (channel center)
- Output frequency step size . . . . . . .32.0 KHz
- Downstream per-channel bit rate. . .27 Mbps (64 QAM) and 38 Mbps (256 QAM)

Bridging and Routing

- Layer 2 bridging Layer 3 routing
- RIP v1 and v2
- SmartFlow wire-speed forwarding and flow classification
- Wire-speed QoS