KEY APPLICATIONS

- Extending services to the metro access edge
- On-demand bandwidth provisioning using hardware-based rate limiting technology with kilobit resolution
- Creating MPLS/Ethernet VPNs, Transparent LAN Services, or Virtual Leased Lines at the access edge
- Delivering services over copper or optical infrastructure — Gigabit and 10/100 Ethernet, T1/E1, T3/E3, ATM, and DWDM

PRODUCT OVERVIEW

The RS 1000/3000 are Riverstone’s metro access routers. Among the most highly deployed access platforms in the metro, they extend IP service delivery to the metro access edge, featuring Riverstone’s metro-optimized MPLS services, full function routing and switching, and dynamic bandwidth provisioning with a connection-oriented data collection architecture. At the same time, the 1000/3000’s combination of a compact form factor and high port density saves operational costs and improves service provider margins.

The key to the platform’s popularity is its unique ability to deliver Layer 3/2 services to the access edge over either existing TDM or ATM networks or available dark fiber. Service providers have deployed the RS 1000 or 3000 to extend the reach of a Metro Ethernet deployment to customers with last-mile TDM access, to offer VLAN-based Transparent LAN services over a wide-area ATM network, or to simply provide fast Ethernet access with Gigabit uplinks. Both the 1000 and 3000 design feature two flexible media slots that accommodate Gigabit Ethernet, WAN, ATM and Packet over SONET/SDH interfaces.

CUSTOMER CHALLENGES & RS 1000/3000 SOLUTIONS

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Solution</th>
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<tbody>
<tr>
<td>Rapidly establish new services over optical or legacy TDM infrastructure</td>
<td>Full complement of WAN interfaces from T1/E1 to 70km Gigabit Ethernet to ATM, combined with full function routing and switching</td>
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<td>Establishing profitable tiered services without compromising performance</td>
<td>Implementing hardware-based traffic classification and accounting including rate limiting and advanced Quality of Service</td>
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<td>Rapidly changing customer demands create need for new services and configurations — without costly truck rolls</td>
<td>Open APIs enable dynamic provisioning while MPLS enables rapid service creation from the metropolitan area through the Internet core</td>
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<td>Initiating value-added services while delivering security and flexible addressing</td>
<td>Wire-speed security filters and hardware-based Network Address Translation (NAT) offers user, address, application, and port level security. MPLS tunnels and extended metro area VLANs provide traffic segregation</td>
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RS 1000/3000 Metro Access Routers

Specifications

Capacity and Performance
- Up to 4,006 VLANs
- Up to 256,000 routes
- Up to 20,000 security/access control filters
- Up to 512,000 Layer 4 application flows
- Up to 256,000 Layer 2 MAC addresses
- RS 1000: 12 Gbps non-blocking switching fabric
- RS 3000: 4.6 million packets per second routing throughput
- RS 5000: 20 Gbps non-blocking switching fabric
- RS 9000: 9.5 million packets per second routing throughput
- MTBF (predicted) > 200,000 hours

Physical
- Dimensions: 32.5 x 19 x 7.1 W x H x D (82.5 cm x 43.2 cm x 46.7 cm)
- Weight: 20 lbs (9.1 kg)

Environmental Specifications
- Operating Temp: 0° to 40°C (32° to 104°F)
- Non-operating Temp: -40° to 70°C (-40° to 158°F)
- Operating Relative Humidity: 10% to 90% (non-condensing)
- Non-operating Relative Humidity: 5% to 95% maximum
- Altitude, Operating: 10,000 ft (3,000 m) maximum
- Shock and Vibration: G63

Power Requirements
- AC Input current: 3.0 A - 1.5 A
- AC Input voltage: 100 to 240 VAC
- AC Frequency: 50 to 60 Hz
- DC Input current: 8.0 A
- DC Input voltage: -48 to -60 VAC

Agency Standards and Specifications
- Safety: CE Certified UL1950, CSA C22.2 No. 950, EN60950, ICES-001, and JEH/3/ECC
- Electromagnetic Compatibility: Compliant with the requirements of: Part 15, 18 CFR 15; 1997 BGP Communities Attribute
- QoS: Application level, RSVP
- IP routing: RIPv1/v2, OSPF, BGP-4, IS-IS

Standards Supported

IETF Standards Support
- RFC No. Title
- 766 JUDP
- 781 TFTPv2
- 781 IP
- 793 IGRP
- 832 ARP
- 834 Telnet
- 952 Bootstrap
- 1058 LIP-VL
- 1075 DVMRP
- 1127 Internet extensions for IP multicasting
- 1137 IETF
- 1195 Use of ISO/IEC 10589 in Routing for TCP/IP and Dual Environments
- 1245 OSPF Protocol Analysis
- 1246 Experience with the OSPF Protocol
- 1256 OSPF Router Discovery Message
- 1257 OSPF Protocols Analysis
- 1266 Experience with the BGP Protocol
- 1274 BGP
- 1332 BGP-analogue
- 1339 Type of Service in the Internet Protocol Suite
- 1349 Connectivity and Extensions for the Bootstrap Protocol
- 1522 PPP-IP
- 1570 PPP-IP Extensions
- 1576 Guidelines for Running OSPF over Frame Relay Networks
- 1594 BGP-IETF Option
- 1607 P-MIB
- 1618 PPP BCP
- 1637 Definitions of Managed Objects for BGP-4 using SMIL
- 1661 PPP
- 1662 PPP in a HOC-like Framing
- 1745 BGP-ADLP for IP and OSPF Interaction
- 1765 OSPFv2 Database Protocol
- 1771 BGP-4
- 1773 Experience with the BGP-4 Protocol
- 1776 BGP-4 Protocol Analysis

IETF Standards MB Support
- RFC No. Title
- 1477 PPP-LCP-MIB
- 1478 PPP-LCP-MIB
- 1479 PPP-LCP-MIB
- 1484 Bridge-MIB
- 1493 Bridge-MIB
- 1584 IS-IS-MIB
- 1689 SONET/SDH Interface Type-MIB
- 1695 ATM-MIB
- 1757 ATM-MIB
- 1763 ATM-MIB
- 1805 IS-IS-MIB
- 1857 IS-IS-MIB
- 1871 IS-IS-MIB
- 1907 IS-IS-MIB
- 2007 IS-IS-MIB
- 2236 IS-IS-MIB
- 2373 IS-IS-MIB
- 2450 IS-IS-MIB
- 2565 IS-IS-MIB
- 2605 IS-IS-MIB
- 2686 IPv6 2003 Medium Attachment Units (MAs) MIB
- 2764 IPv6 2003 Medium Attachment Units (MAs) MIB
- 2787 VPR-P-MIB

Standards and Protocols
- P routing: RIPv1, RIPv2, OSPF, BGP-4, BGP, IS-IS
- Multicast support: DS3, T1, DS1, 2.048 Mbps for ISDN, 2,048 Mbps for ISDN
- Application layer: RSVP
- IPv4: IPv4
- IPv6: IPv6
- IPv6: IPv6
- IPv6: IPv6