Lucent Technologies
Bell Labs Innovations

Cajun™ P550™ Gigabit Switch and Routing Switch

Supporting the Next Wave of Networking

The Cajun™ P550™ Gigabit Switch and Cajun P550 Routing Switch are the flagship members in Lucent Technologies family of Gigabit Ethernet switching products, supporting the requirements of the next wave of networking: more bandwidth, elimination of bottlenecks, better manageability and dependable multimedia support.

Lucent Technologies Cajun P550 Gigabit Switch and Cajun P550 Routing Switch offer an unrivaled combination of capacity and scalability in extensive, top-to-bottom, fault-tolerant architectures with no single point of failure and advanced Class of Service/Quality of Service (CoS/QoS) features. With an industry-leading 45.76 gigabits per second (Gbps) backplane switching capacity, the two Cajun P550 Switches satisfy the demanding requirements of bandwidth-starved campus backbones and high-performance workgroup environments.

Highlights

- **Backplane capacity of 45.76 Gbps**
- **Switching throughput capacity of 22.88 Gbps**
- **Up to 33,000,000 pps Layer 2 switching**
- **Up to 18,000,000 pps Layer 3 routing in the routing switch**
- **Layer 2 and Multilayer (Layer 2/Layer 3) modules**
- **Fault tolerant fans, power, switch, links, management**
- **Unique Lucent OpenTrunk™ VLAN interoperability**
- **Class of Service/Quality of Service/RSVP support**

Both switches are based on the Cajun Switch Core, an internally-developed Application Specific Integrated Circuit (ASIC) chipset, which includes:

- Fault-tolerant switching engine implemented on a 45.76 Gbps backplane
- Queue Management Engine for traffic prioritization and optimized multicasting
- Address Filtering Engine that supports Layer 1 (port-based), Layer 2 (MAC address-based) and in the routing switch, Layer 3 (protocol-based) virtual LAN (VLAN) lookup at wire speeds
- Packet Routing Engine for traditional packet-by-packet routing of IP and IPX traffic that scales up to 18,000,000 packets per second

Industry-Leading Capacity

At 45.76 Gbps, the 7-slot Cajun P550 Switches have two-to-three times the capacity of any other Gigabit Ethernet switch available and the architecture to deliver it. Offering six payload slots for media modules, the switches support up to 24 full-duplex Gigabit Ethernet ports, up to 120 10/100 Ethernet ports or up to 60 fiber Fast Ethernet ports.

The Cajun P550's balanced architecture guarantees network integrity and throughput by helping to ensure that bandwidth demand will not outstrip its switching or routing capacity as modules are added. Its crossbar switching fabric scales far beyond shared bus and shared memory designs in competitive lower-capacity switches. And, its aggregate forwarding rate is 33,000,000 packets per second (pps) for Layer 2 switching (Performance Proven by Strategic Networks Laboratory) and 18,000,000 pps for Layer 3 routing in the routing switch.

Integrated Routing

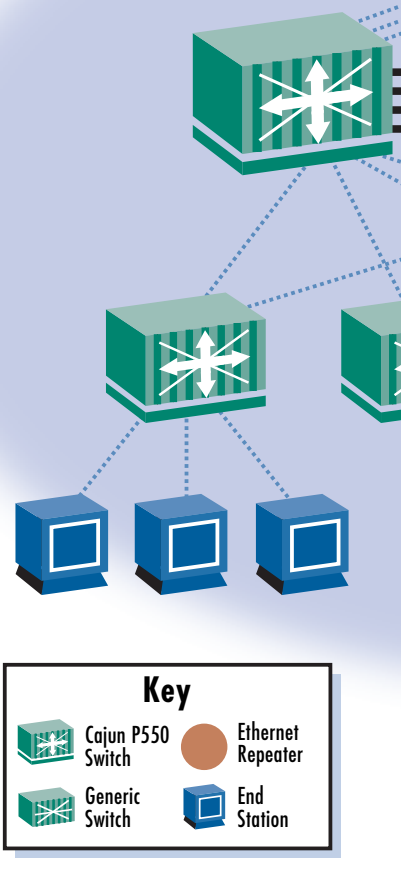
The Cajun P550 Switch can also be configured as a completely scalable and interoperable wire-speed Layer 3 router (IP and IPX) using Lucent Technologies multilayer (Layer 2/Layer 3) modules. In this version, multilayer Supervisor Modules and multilayer Media Modules each add 1.5 or 3 million pps of Layer 3 routing to wire-speed Layer 2 switching. In addition, any combination of Layer 2 and multilayer modules can coexist in the same chassis, providing flexibility in the way you configure your network.

Unlike inflexible products that lock you into an expensive Layer 3-only implementation, the Cajun P550 Routing Switch adapts to existing network designs and allows network managers to implement Layer 3 routing when needed and where needed—either in the backbone core or out closer to the desktop edge.

Flexible VLANs

Both versions of the Cajun P550 Switch bring more flexibility to virtual LANs than any other Gigabit Ethernet switch. Lucent Technologies unique OpenTrunk technology allows VLAN tagging formats from multiple vendors to interoperate. Both Cajun P550 Switches support not only the IEEE 802.1Q standard, but also support two pre-standard implementations, including 3Com's LinkSwitch[1] VLT and a widely-used multilevel tagging scheme. OpenTrunk translates VLAN information, as well as Class of Service information, between three different frame formats so that VLANs can interoperate across multiple tagging domains.

The Cajun P550's Hunt Group capability allows bandwidth to be aggregated across multiple switch links into a single, logical group to increase capacity and fault tolerance and balance network loads.



Scalability

Both Cajun P550 Switches perform multicast pruning—sending IP multicast traffic to only those ports that are involved in the multicast group. Multicast pruning preserves valuable bandwidth by flooding packets only to segments that need to see them. This occurs two ways: "eavesdropping" on the IP multicast Internet Group Management Protocol (IGMP) packets, which designate the addresses of the multicast group; and support for the IEEE 802.1p Group Address Registration Protocol (GARP).

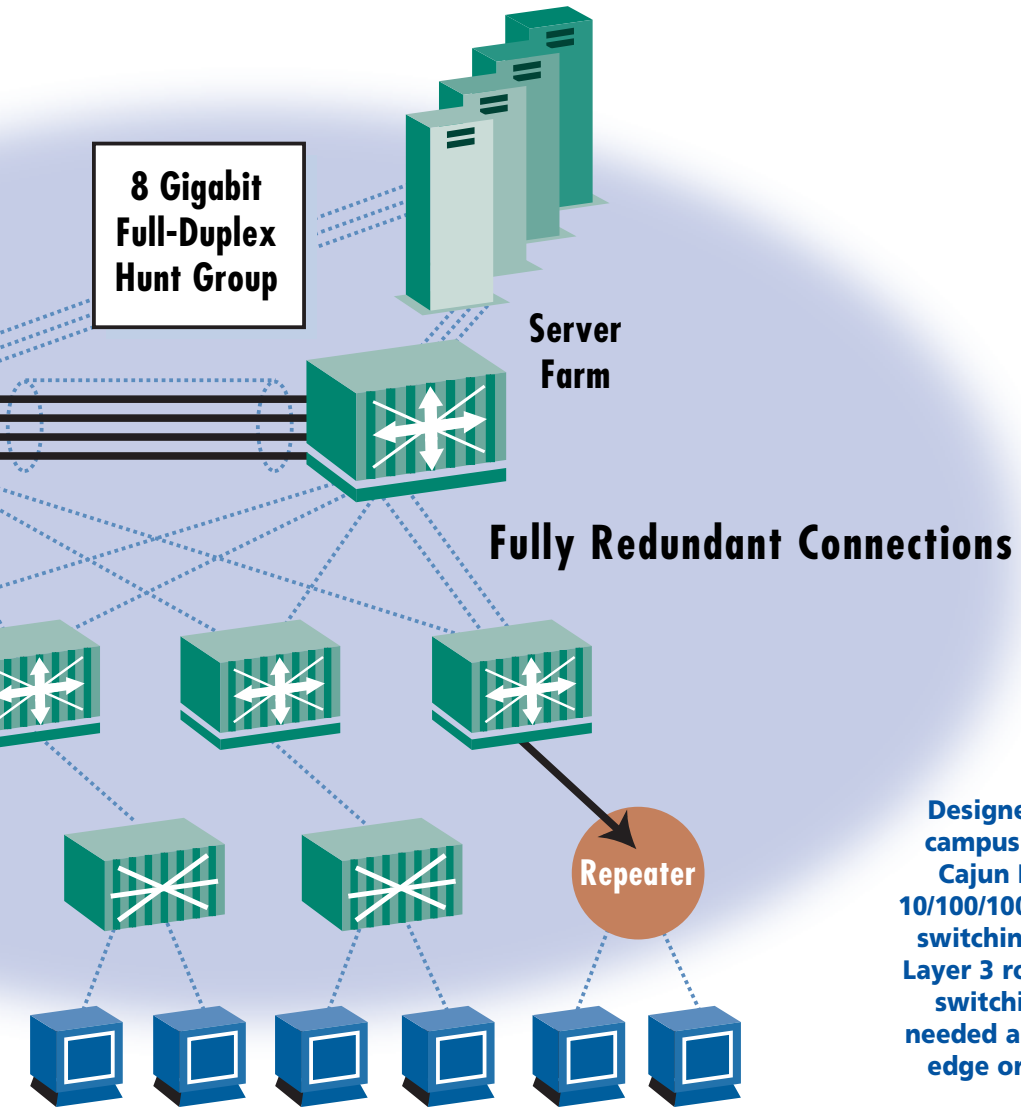
The Cajun P550 Switches also perform flood suppression on lower-speed links to prevent them from being overwhelmed by broadcast storms, unknown destination traffic or unknown multicast traffic.

With the Cajun P550 Gigabit Switch, network managers can create gigabit-scaled hunt groups, which allow multiple switch-to-switch links to participate in a single, logical group for higher-capacity connections, more scalability, enhanced fault tolerance, load balancing and quick recovery from link failure. When a link fails in a hunt group, traffic is automatically redistributed among the remaining ports with no network downtime. The Cajun P550 Switch also supports both standard IEEE 802.1D spanning tree configurations or a unique two-layer spanning tree approach for better scalability and fault-tolerance.

Extensive Fault Tolerance

Designed from the ground up as a backbone switch, the Cajun P550 Switch offers a top-to-bottom, fault-tolerant architecture with no single point of failure. Utilizing a passive backplane, the Cajun P550 Switch supports an N+1 hot-swappable, load-sharing power system. In the event of a failure in one fan, the network management software alerts the user in plenty of time to hot-swap a fan tray on the fly, rather than having to shut down the switch.

All modules for the Cajun P550 Switch are hot-swappable with support for an optionally-redundant Supervisor Module. Further, the crossbar switch ASIC supports N+1 fault-tolerant switching elements so that if a failure in one of the crossbar switching elements is detected, a hot standby spare is brought online automatically, allowing the switch to continue to run until maintenance can be scheduled.



Designed specifically with the campus backbone in mind, the Cajun P550 Switch combines 10/100/1000 Mbps Ethernet Layer 2 switching and wire speed IP/IPX Layer 3 routing so you can deploy switching and routing where needed and when needed—at the edge or core of your network.

Additionally, the hunt group and spanning tree capabilities of the Cajun P550 Switch allow you to configure additional levels of fault tolerance into your campus network.

The Cajun P550 Switches come standard with a Supervisor Module or Multilayer Supervisor Module, each of which can be configured with an optional redundant Supervisor Module.

Comprehensive, Web-Based Management

The capacity and scalability of the Cajun P550 Switches are equaled by their comprehensive, Web-based management system, which provides point-and-click configuration of Cajun P550 Switches with any frames-capable Web browser. The system includes Cajun Web agent software running on the RISC-based Supervisor Module. Standard with every Cajun P550 Gigabit Switch, the Supervisor Module provides Web-based management for all on-board diagnostics, VLAN management, RMON monitoring and configuration management.

Administrators can manage and configure multiple Lucent switches with the Java[2]-based Lucent CajunView™ Suite that runs on Windows NT and Windows 95[3], and delivers snap-in HP OpenView[4] support. The SNMP-based CajunView Suite allows full topology mapping, integrated drag and drop VLAN management, performance management, configuration management and integrated alarm and event logging. The Cajun P550 Switches offer a familiar Command Line Interface for configuration and management.

Configurations

Cajun P550 Switch

P5500-SW	Lucent Cajun P550 Switch (includes Supervisor Module and a 400W Supply)
P5500FT-SW	Fault-Tolerant P550 Switch (includes Supervisor Module, Fault-Tolerant Switching Elements and three 400W Supplies)
M5502-1000SX	2-Port 1000BASE-SX Module FDX (850nM)
M5502-1000LX	2-Port 1000BASE-LX Module FDX (1300nM)
M5502-1000SLX	2-Port 1000BASE-SLX Module FDX (1300nM)
M5504-1000SX	4-Port 1000BASE-SX Module FDX (850nM)
M5504-1000LX	4-Port 1000BASE-LX Module FDX (1300nM)
M5504-1000SLX	4-Port 1000BASE-SLX Module FDX (1300nM)
M5510-100FX	10-Port 100BASE-FX Module
M5520-100TX	20-Port 10/100BASE-TX Module

Cajun P550 Routing Switch

P5500R-SW	Lucent Cajun P550 Routing Switch (includes Multilayer Supervisor Module and a 400W Supply)
P5500RFT-SW	Fault-Tolerant P550 Switch with Integrated Routing (includes Multilayer Supervisor Module, Fault-Tolerant Switching Elements and three 400W Supplies)
M5502R-1000SX	2-Port 1000BASE-SX Module with Integrated Routing FDX (850nM)
M5502R-1000LX	2-Port 1000BASE-LX Module with Integrated Routing FDX (1300nM)
M5502R-1000SLX	2-Port 1000BASE-SLX Module FDX (1300nM)
M5510R-100FX	10-Port 100BASE-FX Module with Integrated Routing
M5512R-100TX	12-Port 10/100BASE-TX Module with Integrated Routing

Spares and Accessories

SW-MGMT-V1.1	Lucent CajunView Cajun P550 Manager, Version 1.1
P5500-SCTRL	Crossbar Control Module
P5500-SXBAR	Crossbar Element Module
M5501-MEM16	Supervisor Memory Upgrade
P5507-C	Spare Chassis (No Power Supplies)
P5507FT-C	Spare Fault-Tolerant Chassis (Fault-Tolerant Switching Elements, No Power Supplies)
P550P-400	Spare 400 Watt Power Supply
M5500-SUP-8	Spare Supervisor Module
M5500R-SUP-32	Spare Multilayer Supervisor Module

Cajun P550 Switch Specifications

Power

AC input voltage:
100-120/200-240 VAC
@ +6%, -10%

Frequency: 50-60 Hz

Maximum Power Consumption:
8.0 A @ 120 V
4.0 A @ 240 V

Operating/Physical

Operating Temperature: 0° to 40° C

Storage Temperature: -20° to 80° C

Relative Humidity: 5% to 95% noncondensing

Physical Dimensions:
17.5″ W x 18″ D x 10.5″ H

Safety	EMI
UL 1950	FCC 15, Class A
EN60950	CE Mark
TUV GS	EN55022 Class A
CSA 22.2-No. 950	CISPR 22 Class A
IEC 950	

Performance and Capacity

Backplane: 45.76 Gbps

Switching:
33 million packets per second

Routing (IP/IPX):
18 million packets per second

Maximum Gigabit Ethernet ports:
24 (switching)12 (routing)

Maximum Fast Ethernet ports:
120 (switching) 72 (routing)

Latency: Less than 4 microseconds (switching) (FIFO)
Less than 6 microseconds (routing) (FIFO)

VLANs 1000

Address Forwarding Table Entries:
24,000

Routes: 16,000

Maximum flows: 240,000

Reliability and Redundancy

Hot-swappable parts:
Supervisor modules
Media Modules
Power Supplies
Fans

N+1 fault tolerance:
Switch matrix and controllers
Supervisors
Power supplies

Protocols and Standards Compliance

IEEE 802.1D	Bridging Standard, including Multicast & Class of Service
IEEE 802.1Q	Virtual LANs
IEEE 802.2	LLC
IEEE 802.3	Ethernet
IEEE 802.3u	Fast Ethernet
IEEE 802.3x	Flow control
IEEE 802.3z	Gigabit Ethernet
IEEE 802.3ac	VLAN tagging over Ethernet networks, IPX RIP and SAP Router Specification, Version 1.30, May 23, 1996
RFC 768	UDP - User Datagram Protocol
RFC 783	TFTP - Trivial File Transfer Protocol
RFC 791	IPv4 - Internet Protocol version 4
RFC 792	ICMP - Internet Control Message Protocol
RFC 793	TCP - Transmission Control Protocol
RFC 826	Ethernet Address Resolution Protocol (ARP)
RFC 854	Telnet
RFC 903	Reverse Address Resolution Protocol (RARP)
RFC 951	BootP
RFC 1058	RIP
RFC 1112	Host extensions for IP multicasting (IGMP)
RFC 1157	SNMP v1 - Simple Network Management Protocol version 1
RFC 1191	Path MTU discovery
RFC 1213	MIB-II
RFC 1256	ICMP Router Discovery Messages
RFC 1332	The PPP Internet Protocol Control Protocol (IPCP)
RFC 1493	Bridge MIB
RFC 1542	BootP
RFC 1584	Multicast Extensions to OSPF
RFC 1587	The OSPF NSSA Option
RFC 1661	Point to Point Protocol (PPP)
RFC 1662	PPP in HDLC-like framing
RFC 1643	Ethernet MIB
RFC 1723	RIP Version 2
RFC 1724	RIP Version 2 MIB Extension
RFC 1757	RMON Groups: etherStats, history, events, alarms
RFC 1850	OSPF Version 2 Management Information Base
RFC 2178	OSPF Version 2
RFC 1866	HTML - Hypertext Markup Language version 2
RFC 2068	HTTP Hypertext Transfer Protocol
RFC 2131	DHCP - Dynamic Host Configuration Protocol
RFC 2236	Internet Group Management Protocol, Version 2 Lucent Router Redundancy Protocol

Delivering Solutions from the Network to the Enterprise to Your Fingertips

Lucent Technologies is delivering an end-to-end networking strategy that includes products, application services and network management solutions. It spans both customer premises and service provider environments—including data, voice and video applications via packet and cell technologies. Lucent Technologies' strategy includes future and legacy infrastructures and professional services for design, implementation and ongoing support.

Lucent continues to bring the heritage of designing and building the world's highest quality, most reliable voice networks to the data networking industry. With the proven research, development depth and innovation of Bell Labs, and through our strategic partnerships, we are making today's data networking environment more reliable, less complex and simpler to use and manage.

If your business relies on your communications network, you can rely on the company that builds and maintains the world's most reliable networks: Lucent Technologies.

To learn more, contact your Lucent Technologies representative, visit our Web site at **www.lucent.com/dns**.

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