Lucent Technologies
Bell Labs Innovations



SOLUTIONS BACKGROUNDER

Revenue Opportunities with Access Point® IP Services Routers

Extending Service Intelligent™ Networks to the Customer Premises

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Table of Contents

CPE-Based IP Services: Business Drivers and Growth Opportunities 2
Lucent's Strategic Focus: Service Intelligent™ IP Networking 3
Access Point® Routers: Service Intelligence at the Customer Premises 4
The Access Point® Difference 6
Access Point® IP Services Solutions 8
Access Point® Product Direction 17

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CPE-Based IP Services: Business Drivers and Growth Opportunities

Fast-accelerating technology and marketplace changes—combined with today's uncertain economic climate—pose unprecedented challenges for both telecommunications service providers and their enterprise customers.

The profitability of carriers' transport-centric voice and data network infrastructures continues to decline, as these traditional "cash-cow" services become commodities differentiated mainly on price. Increasingly, this trend is extending into the broadband realm, where narrowing margins for raw transport and Internet access services exacerbate the "profit squeeze."

Service providers seek to combat this commoditization by leveraging their existing backbone network assets. They are looking for cost-effective ways to "add value to the packets," i.e., to deliver higher-margin business-quality IP services that can attract and retain a lucrative enterprise customer base. And, given current budgetary constraints, they are looking to accomplish this in a manner that preserves current infrastructure investments and minimizes up-front capital expenditures.

Enterprises, meanwhile, increasingly recognize the critical importance of taking fuller advantage of the benefits IP-based technologies can bring. As their data networks become more strategically central business assets, the pressures for faster access, higher availability, and more robust applications continue to build. Enterprises are looking to respond by implementing powerful new capabilities such as IP virtual private networking (VPN), bandwidth management, service-level assured Internet access, mobile IP services, reliable data security protection, web/application hosting, and data center server farm management.

The internal IT organizations traditionally charged with implementing such capabilities are facing a critical skills crunch. Focused on making the most of their own core competencies, they have neither the time nor the resources to cope with the complexities of IP planning, deployment, management, and support. In addition, the frequent technology upgrades required to keep pace with relentless advances and user demands make total ownership costs of IP network equipment prohibitive for many organizations.

The bottom line: Service providers need to increase profitability with high-margin IP services that can be brought to market without major capital expenditures or extensive buildouts of their core networks. Enterprises need to implement IP services that can be deployed quickly, managed and controlled easily, secured readily, and enhanced cost-effectively to accommodate business growth and change.

As services and their enterprise customers alike are finding, both sets of needs can often be best addressed by introducing "smart" IP services platforms at enterprise premises, and by contracting for diverse IP services capabilities that can be delivered via these platforms on an outsourced, managed services basis.

Locating CPE devices at enterprise sites enables service providers to help customers meet their IP networking requirements with a range of flexible deployment and services options. It enables new revenue streams to be opened with extremely small incremental capital costs, and with no need to re-engineer infrastructure networks. Providers can leverage the strengths of the public network and their own core competencies to create significant economies of scale by sharing infrastructure and resources among multiple customers. Under the managed services model, the service provider may retain ownership of the CPE or, alternatively, it may be purchased or leased by the enterprise.

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By tailoring managed CPE-based offerings to the specific needs of end-users and their mission-critical applications, providers can achieve a high degree of competitive differentiation. They can market multiple mass-customized services that are far less price-sensitive than commodity offerings. They can address changing customer needs by continuously adding new value-added IP services—implemented on a "pay-as-you-grow" basis—to their menus of offerings. And they can maintain increasingly profitable business relationships with high-value enterprise customers.

The market for managed IP services, in particular for managed CPE-based IP capabilities, is burgeoning around the globe. According to International Data Corporation (IDC), worldwide revenues are expanding at nearly 48% annually. VPN services represent an especially explosive area—and an attractive revenue opportunity for service providers. Infonetics Research forecasts that 84% of today's large enterprises will be using VPNs by 2005, and that service provider-managed IP VPNs will eclipse those managed by businesses themselves as early as 2002. Worldwide end-user VPN services expenditures are expected to grow from US$10.7 billion in 2001 to US$41 billion in 2005, a 283 percent increase.

Another Infonetics study finds that 88 percent of European enterprises are currently planning to deploy CPE-based VPNs. An estimated 70 percent of these intend to outsource some aspect of their VPN implementations, or to contract for them on a managed services basis.

Lucent Technologies is well positioned to help service providers seize this fast-growing market opportunity. Lucent has devised an innovative, service-intelligent approach to deploying, provisioning, and managing CPE-based IP services. And, with its industry-leading Access Point product line, Lucent offers a complete family of "smart," multi-service CPE routers that are purpose-built for IP services success.

Lucent's Strategic Focus: Service Intelligent™ IP Networking

Lucent's Access Point "Smart Access" router platforms are the CPE component of the industry's first end-to-end service intelligent IP architecture. This pioneering approach facilitates cost-effective delivery of value-added business-quality IP services tailored to the dynamic needs of end-users and their applications.

Unlike traditional networks that simply carry IP traffic along routed and switched connections, Lucent's service intelligent networks and smart access devices recognize individual users and their applications, understand their distinctive service needs, and dynamically allocate all the required resources and bandwidth.

For end-users, service intelligence ensures a full complement of highly customized "follow me" services that are always available, regardless of where or how they access the network. A sales executive, for example, may on one occasion log on from her office, on another seek access to corporate resources through a home-based broadband connection, and on still another connect from a client location. In each case, the service intelligence resident in the network would ensure timely provisioning of the appropriate services.

For service providers, the service intelligent approach is an ideal solution for delivering premium, high-demand managed IP services—while simultaneously controlling capital expenditures and operating costs. Leveraging key infrastructure elements that are already in place, the Lucent architecture offers a unique new way for service providers to protect existing investments and unlock the value and profitability lying dormant in their transport networks.

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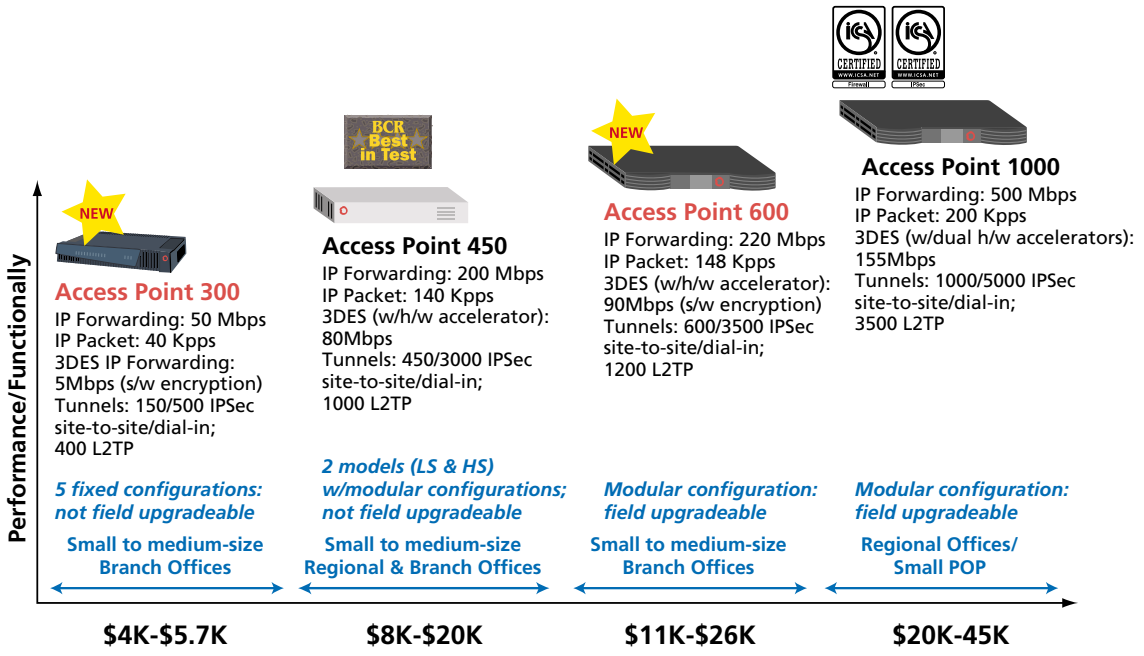
Access Point® Routers: Service Intelligence at the Customer Premises



*The **Access Point product family** comprises proven CPE and small POP routers with diverse performance and IP services applications-support capabilities.*

The Access Point IP services router family brings service intelligent networking to the customer premises, offering service providers the simplest, most cost-effective way to move up the value chain from commodity access and transport to highly profitable business-quality IP services.

Meeting the needs of service providers looking to both increase revenues and manage costs, Access Point platforms bring new price/performance standards to the delivery of IP services. To maximize service provider ROI, each Access Point unit integrates all the necessary components for a wide array of enhanced IP services in a single multi-service platform. Purpose-built to deliver IP services with robust multi-access routing, quality of service (QoS), VPN, and policy management capabilities, Access Points offer quick and simple deployment in enterprise environments of diverse sizes and descriptions, as well as flexible customer and/or service provider management.

Access Point products feature performance-tested routing functionality expressly designed to satisfy the rigorous demands of today's IP networks. They enable service providers to move the IP services demarcation point to the customer premises, allowing that premises to function in the network environment as if it were a small point of presence (POP). Support for a full suite of routing protocols including OSPF, BGP-4, Multicast, and VRRP—and for WAN interfaces from ISDN to OC-3—enables Access Points to integrate smoothly within large-scale network environments.

State-of-the-art Class-Based Queuing (CBQ) technology provides for industry-leading QoS. This is critical given the unique and rigorous demands IP services place on both system and network resources.

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Also built into every Access Point is a sophisticated set of VPN security features based on the industry-accepted IP Security (IPSec) standard for secure level-three tunneling and L2TP for layer-two tunneling. In addition, an integral ICSA-certified stateful packet filtering firewall provides all of the security capabilities needed to fully protect the data infrastructure at the edge of the network. Both the IPSec and firewall implementations have been awarded ICSA certification.

To enable cost-effective deployment of CPE-based IP services, the Access Point family is built around a rich set of management capabilities performance-proven to be best-in-class and extremely effective in enabling large-scale deployments of VPN and other IP services networks. As fully SNMP-managed systems, Access Point routers are easily integrated into existing network operating system environments for service provisioning, service-level monitoring and management, and billing support.

The performance-proven, industry-leading Access Point product line, now in its third generation, continues to evolve and expand. With the addition of the new Access Point 300 and 600 routers, the Access Point family is well positioned to enable service providers to deliver a complete set of IP applications for enterprise customers at locations ranging from small branch offices to large regional headquarters.

The product line currently comprises:

- **Access Point 300**—Bringing service intelligent IP capabilities to small and medium-sized branch office enterprise locations, Lucent's Access Point 300 routers are offered in five fixed configurations, giving customers a choice of WAN interface options. Support is provided for IP data forwarding rates of up to 50 Mbps, 3DES encrypted traffic forwarding rates of 5 Mbps, and as many as 150 site-to-site or 500 simultaneously active remote access VPN tunnels.

- **Access Point 450**—Available in two configurations—AP 450 LS and AP 450 HS—the Access Point 450 is designed for medium-sized enterprise regional and branch locations, with the AP 450 LS suited to the smaller facilities. It supports data forwarding rates of up to 200 Mbps and 3DES encrypted traffic forwarding rates of up to 80 Mbps with an optional hardware accelerator card. Support is provided for as many as 450 site-to-site or 3000 simultaneously active remote access VPN tunnels.

- **Access Point 600**—With data forwarding rates of up to 220 Mbps, 3DES encrypted traffic forwarding rates of up to 90 Mbps, and support for as many as 600 site-to-site or 3,500 simultaneously active remote access VPN tunnels, the Access Point 600 sets new price/performance standards for regional branch office IP services routers.

- **Access Point 1000**—The Access Point 1000 is built for larger customer premises locations as well as network edge (POP) deployments. It delivers IP data forwarding rates of up to 500 Mbps, 3DES encrypted traffic forwarding rates of 155 Mbps, and support for up to 1,000 site-to-site or 5,000 simultaneously active remote access VPN tunnels.

The product family also includes the **Access Point QVPN Builder**™ software system, a comprehensive IP VPN and QoS policy manager that automates centralized end-to-end provisioning of site-to-site VPNs.

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The Access Point® Difference

The Access Point family members are more than simple CPE routers. Instead, they are versatile *IP service delivery platforms* that go far beyond standard access and routing to support a matchless set of business-quality CPE-based IP services. These services enable end-customers to derive maximum value from IP by fully leveraging the business benefits of the Internet and the enterprise data networking infrastructure. And they enable service providers to rapidly and cost-effectively offer high-margin services by adding "smart," service-intelligent devices at the customer premises.

Multiple high-performance features set the Access Point family apart from the competition in today's CPE router marketplace:

• Multi-service capabilities

Access Point is first and foremost an "all-in-one" CPE platform that lets service providers deliver many diverse IP services from a single box. It supports the full complement of enhanced capabilities required to enable the Internet to become an integral part of the enterprise infrastructure. This includes bandwidth and QoS management; firewall protection; strong, end-to-end encryption; and VPN gateway functionality.

This multi-service device is more than competitive in each of its diverse functions with traditional single-purpose appliances. As outlined below, its price/performance characteristics have been proven superior to those of today's most popular IP routers. Access Point compares favorably with leading dedicated bandwidth managers as well. And it provides tunneling capacities that rival those of dedicated VPN devices.

Combined with Access Point's ICSA-certified firewall functionality, these capabilities add up to a single-box solution that equals and in many respects surpasses competitive vendors' far more costly and management-intensive multi-box solutions.

Access Point's matchless multi-service support makes it easy for service providers to create premium, high-revenue service packages customized to enterprise users' specific needs. One example: layering VPN, bandwidth management, security, and IPSec—all delivered from the same Access Point platform—to create a custom service level assured VPN solution.

• Price/performance leadership

Purpose-built as an IP services platform, Access Point can deliver as much as twice the tunneling and throughput performance at as little as half the price of competitive routers. Because multiple service capabilities are integrated in a single, easily managed platform, Access Points afford substantial total cost of ownership advantages as well.

• Unparalleled scalability

A true growth platform, Access Point offers a service migration path from a single application at the smallest remote office to a multi-service implementation at the largest headquarters site. With its built-in IPSec and Layer 2 Tunneling Protocol (L2TP) support, it delivers sufficient VPN scalability to readily accommodate the largest VPNs currently in existence. In fact, some of world's most extensive IP services networks are generating revenues today with Access Point solutions. A prime example of this support for large-scale VPN services: Access Point's deployment as the CPE component of WorldCom's TotalAccess, the world's leading IP VPN solution. (See page 16.)

• Advanced class-based queuing (CBQ)

Access Point delivers leadership IP QoS based on Class-Based Queuing (CBQ), the open bandwidth management technology defined by leading members of the Internet community. With CBQ, a network administrator can establish and enforce specific bandwidth policies while gaining the visibility necessary to actively manage cost and QoS. This heightened control ensures that the required amount of bandwidth is delivered to the right users whenever and wherever they need it.

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Access Point further enables end-to-end QoS with its support for IETF-defined differentiated services (DiffServ) and Type of Service (ToS) marking. By combining CBQ and DiffServ, a network operator can first prioritize user traffic to meet internal business needs, then map that traffic into the exact end-to-end service levels offered by the IP/Internet backbone. In addition, QoS can be extended to Virtual LANs (VLANs) using the 802.1p/q standard.

• Policy-based provisioning and management

Lucent offers a policy-based IP services provisioning and management tool purpose-built to help service providers cut deployment costs, speed time-to-market, and enhance the reliability of CPE-based IP services.

Access Point QVPN Builder™, an integral part of the Access Point family, is an easy-to-implement "turnkey" management system. It gives service providers a powerful VPN and QoS policy manager for cost-effective service deployment, management, and scaling. Automating and centralizing end-to-end provisioning, QVPN Builder enables VPN and QoS networks to be readily scaled to hundreds of individual user sites. As a result, service providers can quickly increase revenue streams and offer enterprise customers flexible, manageable networks that meet demanding e-business requirements with a variety of deployment options.

QVPN Builder's management application components include:

–*VPN Tunnel Manager*—to define secure tunnel profiles

–*Firewall/QoS Manager*—to build firewall and bandwidth management policies

–*NAT Configurator*—to prescribe Network Address Translation policies

–*Traffic and Tunnel Status Monitor*—to display real-time traffic flow

QVPN Builder is fully compatible with Lucent's Navis™ iOperations IP service management solution, a single, unified service management platform for managing customer interactions, service creation and activation, overall network capacity and performance, and individual network devices. Navis iOperations automates the provisioning of IP services end-to-end over Lucent core networking, service switching, and customer premises equipment, enabling service providers to rapidly deliver value-added offerings and substantially shorten time-to-revenues.

• Built-in mobile IP support

Access Point supports basic Mobile IP Foreign Agent/Home Agent services in accordance with RFC2002-2006 standards. Coupled with the family's superlative WAN access routing functionality, this enables service providers to provide enterprises' mobile workers with the same suite of IP services available in their wireline environments, including high-speed Internet access, VPN, and bandwidth management.

• Wide multivendor interoperability

Access Point is designed to work seamlessly in customer premises environments with equipment and applications from multiple suppliers. Support for popular physical interfaces and data-link protocols allows easy implementation of Access Point platforms in virtually any network infrastructure.

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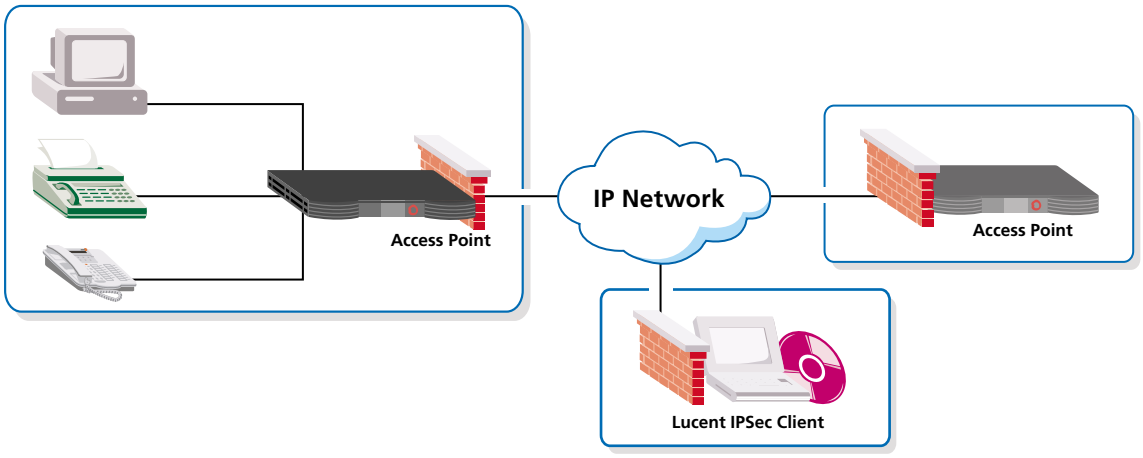
Access Point® IP Services Solutions

As noted previously, the Access Point product family is purpose-built to enable service providers to capture new business opportunities with value-added IP services solutions. Access Point's built-in multi-service capabilities, support for rapid deployment and provisioning of diverse IP applications at the customer premises, and virtually limitless scalability make it easy for service providers to deploy new CPE-based IP services, tailor them to enterprise users' special needs, and modify them as needs grow and change.

The unique capabilities delivered by Access Point platforms are customer-proven in a wide range of real-world IP services environments. All of the CPE-based applications described below are at work today generating new revenue streams and increasing ROI for service providers around the globe.

IP VPN Solutions



Managed CPE—Integrated WAN VPN

Service providers can deploy Access Points at the customer premises to create a complete managed integrated WAN VPN solution. This approach allows for end-to-end security across the overall WAN infrastructure. It also enables rapid initial deployment of VPN capabilities on established or new networks for site-to-site and remote access. Another advantage is virtually limitless scalability: service providers are not constrained by the set of capabilities or capacities in a centralized network node but can deploy resources as needed to meet expanding customer requirements.

This is an ideal solution for providers—with or without extensive facilities—who need to rein-in capital expenditures and thereby enhance bottom-line profitability. It represents the primary means by which both carriers and enterprises are deploying VPN solutions today.

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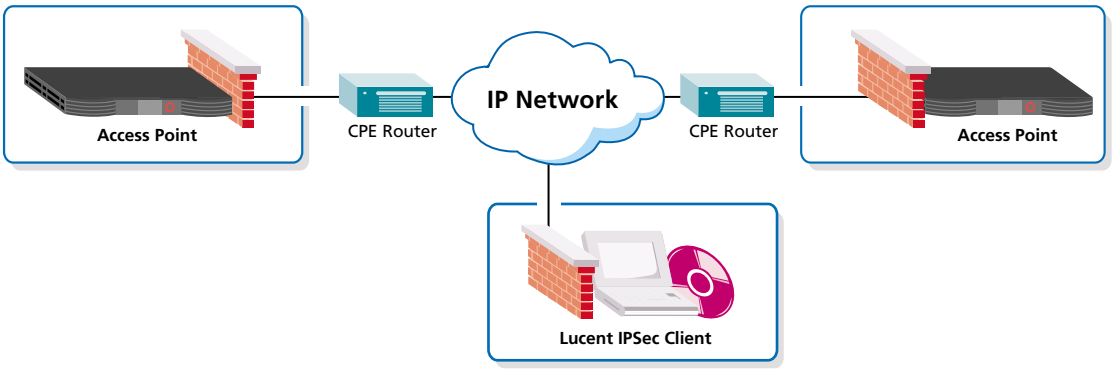
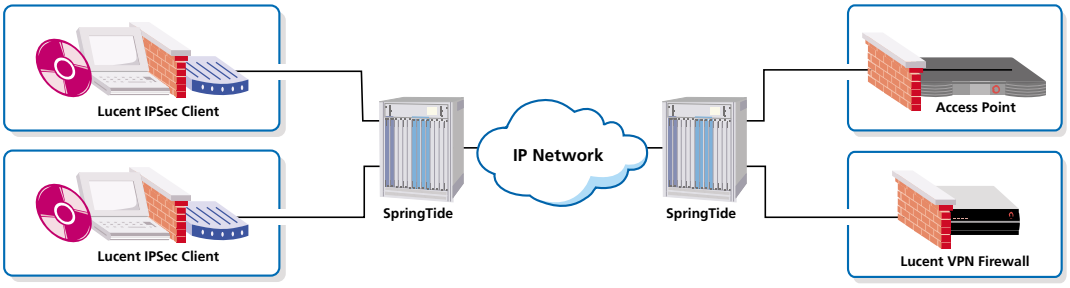


Managed CPE—Overlay Services Solution

Managed VPN solutions can be deployed by using Access Point routers to overlay a set of VPN tunneling and service-level assurance capabilities on an existing network. This approach is best suited for environments wherein service providers need to add profit-boosting services in a cost-effective way. Access Points are linked to the existing infrastructure to enable the value-added services.

With their ability to support multiple services from a single box—including CBQ, security, and VPN—Access Point platforms are uniquely equipped to deliver this set of high-demand managed IP services.



Network-Based VPN

Access Points can also be used to extend or complement network-based VPN solutions such as those delivered by Lucent's SpringTide 5000 or 7000 IP Service Switches. Here the Access Points work with the network-based services to address key last-mile security concerns. Security and VPN capabilities are extended end-to-end, with encryption provided all the way to the customer network edge. Remote access is supported via the Lucent IPSec Client.

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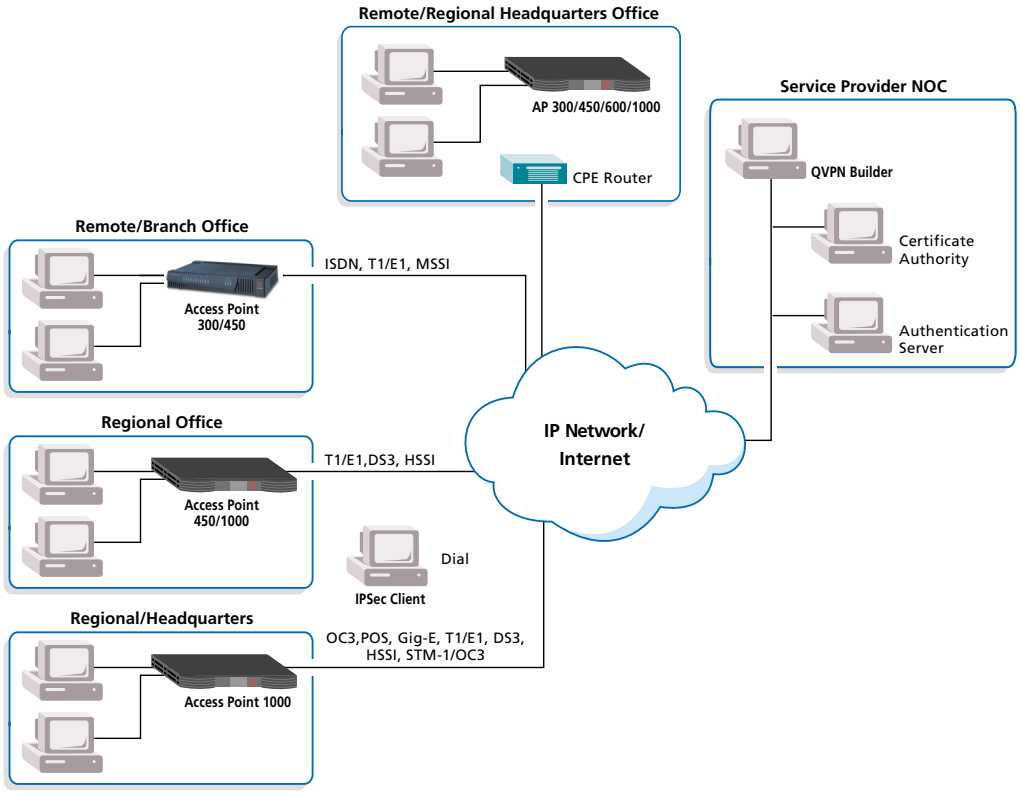
Managed Service Level Assured VPN Solutions



Access Point offers service providers unique capabilities to deliver a powerful customer value proposition for secure, private, and service-level assured IP networking. Essentially defining what a premium IP service can be, this set of capabilities opens multiple attractive revenue opportunities.

With its designed-in class-based queuing, service-level assurance technologies, and security and VPN services, Access Point is built-to-purpose to deliver managed service-level assured VPNs. In the example illustrated here, the Access Points are providing WAN access, IP routing, and secure VPN tunneling using IPSec. In this type of environment, the Access Points may also be providing enhanced security capabilities through the use of their integrated stateful firewall. The Access Points can support site-to-site VPNs connecting each of the locations, as well as remote access VPNs. The latter are enabled by the use of the IPSec client, which can connect to and communicate securely with any of the Access Points at any customer premises.

All of these Access Point capabilities can be provisioned with the highly scalable Access Point QVPN Builder policy management tool.

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Managed Bandwidth/QoS Solutions



Premises-Based Bandwidth Management

Given the extraordinary stresses that IP services place on system and network resources, maintaining quality of service is essential for any viable IP services platform. But QoS in itself can also be offered as a service by exploiting Access Point bandwidth management capabilities.

In the scenario depicted here, guaranteed levels of service quality are ensured by providing for bandwidth management and QoS signaling using customer-premises Access Points connected to IP networks. The service intelligent Access Points provide for QoS through their built-in class-based queuing functionality. CBQ classifies network traffic based on information found in the IP packet header. Bandwidth is then allocated, according to the policies and priorities set by the network administrator, across internal departments, applications, and users.

Directly linking Access Points with the IP network creates a true end-to-end solution by providing for both bandwidth management on the upstream component of the last-mile link and QoS translation and signaling to the network. In addition, Access Points on the customer premises can enable QoS translation all the way into the LAN and the application environment—ensuring that business-critical applications always receive sufficient bandwidth. The Access Points' traffic shaping and traffic limiting capabilities for both LAN and WAN interfaces enable service providers to allocate only the exact bandwidth levels contracted for by each customer, allowing providers to easily offer multiple levels of quality-assured service.

This approach can also be implemented to deliver QoS for off-net applications.



End-to-End Service Level Assurance

Service intelligence on the customer premises and at the network edge can combine synergistically to deliver true end-to-end bandwidth management. In this configuration, the Access Point and its smart access service intelligence at the customer-premises edge work in conjunction with Lucent's SpringTide switch to provide end-to-end QoS and QoS mapping.

The service intelligent Access Point devices signal the SpringTide to indicate the class of service (CoS) required for any given application. The SpringTide uses its queuing and bandwidth-management capabilities to control the bandwidth on the downstream link, and uses DiffServ protocols to signal the quality of service required and instructions on how traffic should be treated as it enters the Access Point. This enables effective management of both the upstream and downstream bandwidth on the last mile, as well as end-to-end QoS all the way into the customer premises.

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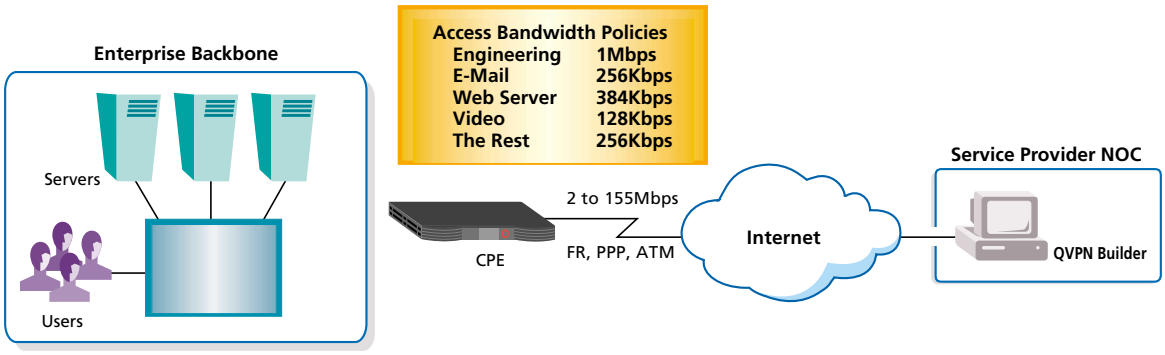
This approach is exemplified in the managed bandwidth service currently offered by Finnish carrier Sonera. One of Europe's most innovative IP services providers, Sonera uses CPE-based Access Points to provide four levels of services to customers across the continent. The Access Points' class-based queuing capabilities provide for signaling of these service levels into Sonera's core network for provisioning of differentiated services end-to-end. IP service differentiation is based on DiffServ, with the various DiffServ classes mapped to ATM for QoS-assured transport. Bandwidth is managed using Access Point's advanced traffic-shaping functionality.

Managed Service Level Assured Internet Access Solutions



For service level assured Internet access—also known as business-class Internet access, CPE-based Access Points provide defined sets of applications with guaranteed bandwidth using CBQ. The end-customer value proposition here is service-quality assurance tailored to the specific bandwidth requirements of diverse applications. The service provider opportunity is the ability to maximize revenues and bottom-line profitability with premium service pricing and high-margin advanced services such as bandwidth and service profiling and tuning, which are made possible by the Access Points' built-in auto-class bandwidth characterization capabilities.

Connecting the enterprise environment into the Internet backbone, Access Point provides for basic access and routing. In addition, it enables delivery of a variety of differentiated services. These typically take two forms. The first is service-level assured IP services, wherein CBQ is used to provide bronze, silver, and gold service levels and Access Point's metering and management capabilities ensure delivery of the desired levels. The second is application-level bandwidth guarantees—service level agreements (SLAs), wherein Access Points control, monitor, and measure the distribution of bandwidth across a variety of internal departments, applications, and users.

For end-to-end servicing, quality of service is signaled LAN-to-WAN via the 802.1p and DiffServ protocols. Scalability to address large numbers of users and end-points is critical here, and this policy management capability is provided by the Access Point QVPN Builder.

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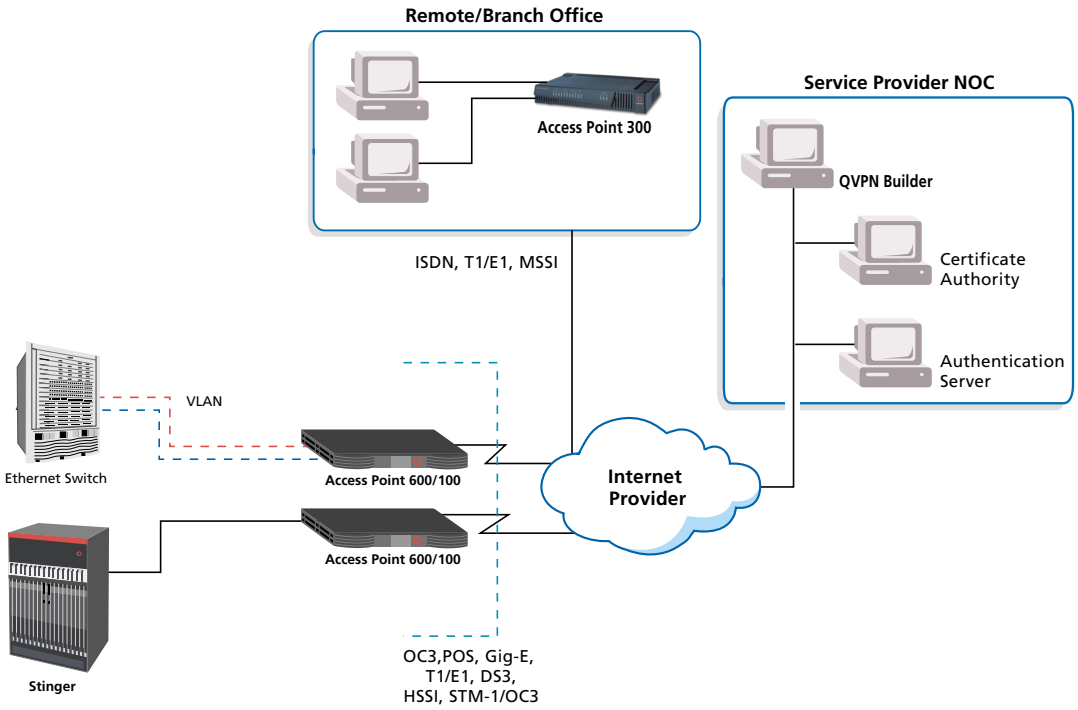
Multi-Tenant Managed IP Solutions



Access Point capabilities for delivering premises-based IP services can be extended from single-customer premises to multi-tenant unit (MTU) and multi-dwelling unit (MDU) applications. In these scenarios, the customer value proposition is much like that of single-customer scenarios, i.e., cost-effective delivery of complete service packages for IP. The service provider revenue opportunity is also similar in terms of providing both basic and premium services, but here services are made available to a larger number of customers in a single building or campus locations. The key enablers—traditional VPN, security, CBQ, and policy forwarding—are standard Access Point capabilities. Here, however, they are extended by a set of layer-two and layer-three VPN tunneling capabilities, as well as the ability to support a variety of in-building infrastructures including Ethernet through advanced VLAN functionality.

Access Points have all the capacity and functionality required to serve as the network access link, as well as the full set of capabilities required to support value-added services in this environment.

Access Points can be combined with Lucent's Stinger DSL Access Multiplexer (DSLAM) or with an Ethernet switch to establish dedicated channels to provide full connectivity and access services for customers within a campus environment, convention center, or any office or residential tower facility. In the scenario depicted here, the Access Point 1000 provides environment-wide Internet access by linking the campus wiring using DSL, and connects into the Internet via its basic access and routing capabilities.

This approach facilitates cost-effective IP services provisioning to multi-sized MTUs/MDUs. It delivers secure IP bandwidth to individual tenants. And it offers the service provider a smooth upgrade path to higher-margin IP services such as VPN, QoS, and firewall protection.

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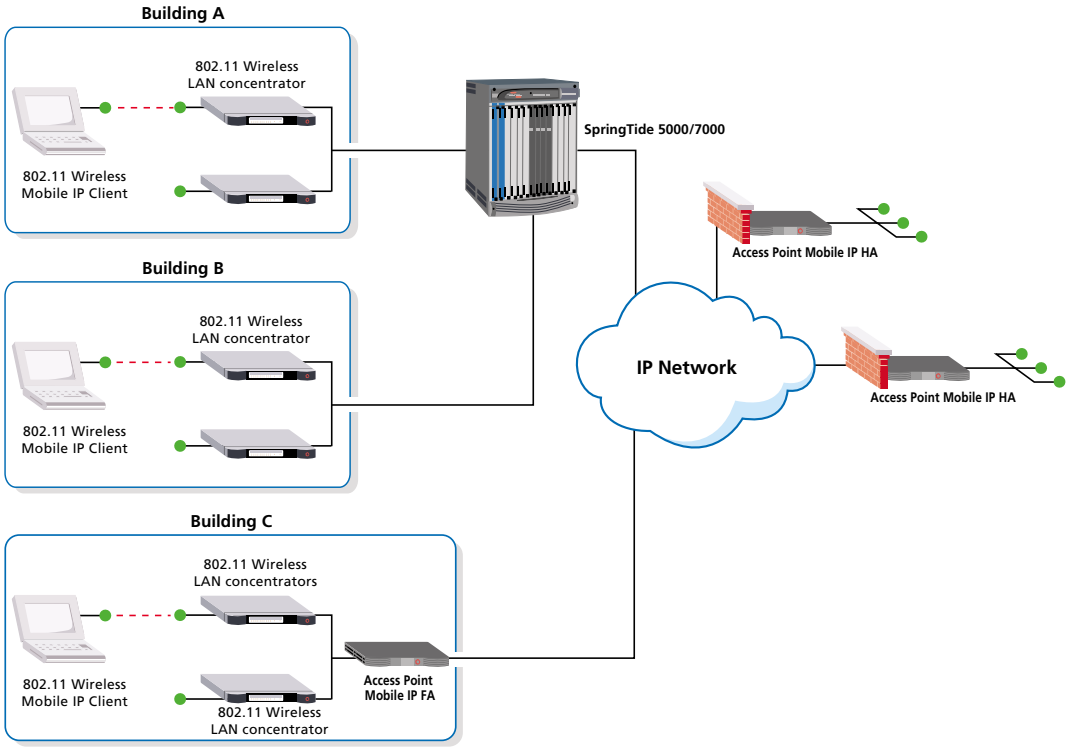
Wireless Mobile IP Solutions



Wireless devices continue to proliferate throughout the business community, and Access Points are uniquely equipped to play a key role in facilitating mobile data communications.

The customer value proposition here is for full mobile Internet data services. Attractive service provider revenue opportunities are opened through delivery of a variety of IP services to mobile workers. The key enablers are the mobile IP Home Agent and Foreign Agent standards-compliant functionality that is built into the Access Point.

Access Points work in conjunction with other wireless-enabled products such as Lucent SpringTide switches to provide comprehensive home agent capabilities. As mobile IP foreign agents, they interoperate with wireless LAN concentrators to link 802.11 wireless IP clients across campus environments into the wired network.

Access Points can also function as both entrance nodes and exit nodes for wireless traffic.

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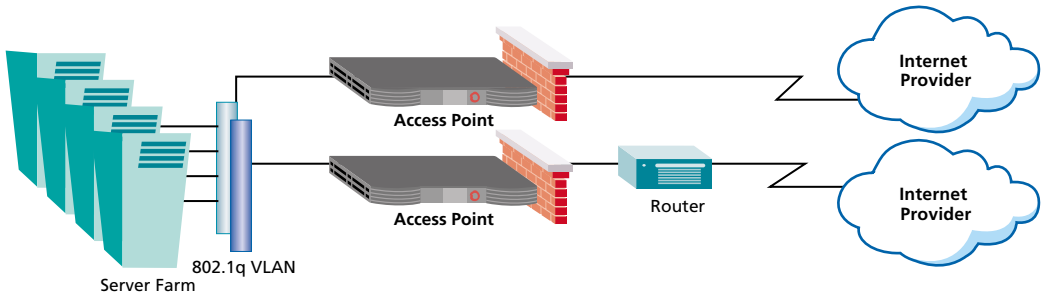
Data Center Web/Application Hosting Solutions



With their integrated bandwidth management and firewall capabilities, Access Points are ideal WAN access, QoS management, and security protection devices for server farms in Web hosting or application service provider environments. In the scenario illustrated here, the Access Point is deployed in an existing router environment to provide for all these critical capabilities. This enables the service provider to offer Web hosting or co-location services that include committed or regulated bandwidth rates, QoS guarantees, and security safeguards bundled together as a premium service package.

Access Point supports this offering by working with an existing access router, in which case it provides the required value-added services. Alternatively, the Access Point itself can perform the routing function as well as providing for bandwidth management, QoS, and security.

State-of-the-art management functionality is critical to successful implementation of this type of service. The Access Point QPVN Builder management system offers unsurpassed capabilities for provisioning and monitoring both the bandwidth management and firewall components.

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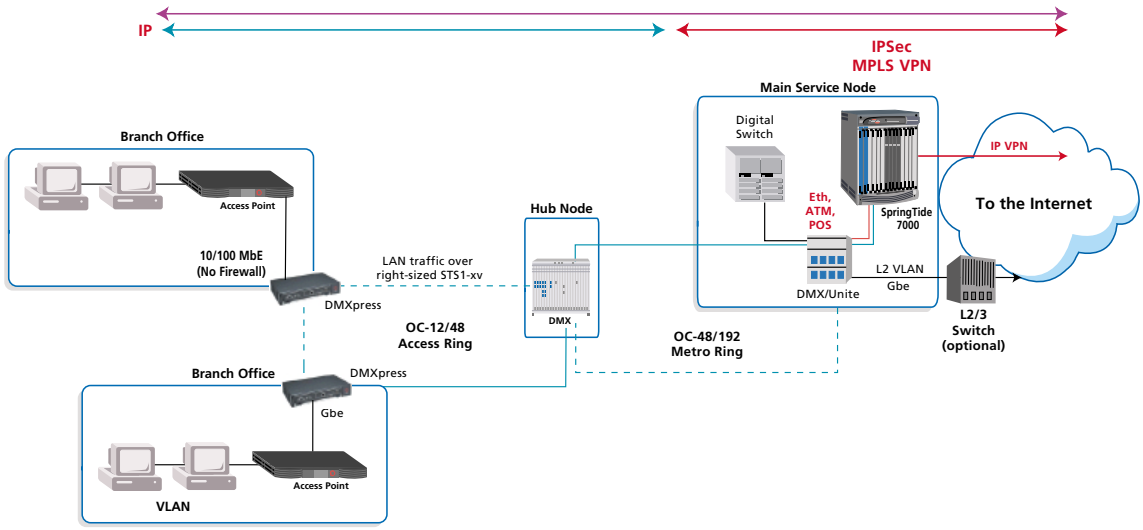
Metro-Optical CPE Solutions



By virtue of its breadth of interfaces and price/performance leadership, the Access Point is well suited to support key applications and provide for premises access in emerging metro-optical environments.

Access Points are easily introduced into such environments. This opportunity is, in effect, a variant of a standard CPE deployment. Access Points facilitate basic access from the customer premises to high-speed metro ring networks through their multi-access routing capabilities. At the same time, they can also enable revenue-enhancing value-added services such as VPN services, bandwidth management, last-mile QoS, and firewall security protection.

Case-in-Point: Access Point-based WorldCom Total Access Solution

Access Point's matchless ability to deliver multiple revenue-generating services from a single platform is perhaps best exemplified in WorldCom's *Total Access* IP VPN solution. This global service offering provides site-to-site and remote access capabilities to medium-sized and large enterprises. Its components can include secure IP VPN services, WAN access, WAN routing, QoS monitoring, and SLA support—all delivered from the Access Point units that are at the heart of the WorldCom solution.

Total Access is implemented using the Access Point QVPN Builder provisioning and management system. QVPN Builder automatically provisions the site-to-site fully meshed and hierarchical VPN networks that are characteristic of the WorldCom service.

WorldCom recently achieved a major milestone by utilizing Access Point CPE-based routers to establish 1,000 dedicated site connections to the IP VPN that the carrier manages for Toyota Motor Sales U.S.A. The Access Points enable Toyota's massive data network to securely link the sales division's offices with independent dealerships, private distributors, and business partners nationwide. In addition, Toyota has integrated WorldCom network conferencing and managed e-mail services with its IP VPN to create a single comprehensive IP-based communications solution for its U.S. operations.

Access Points are deployed in all of the IP VPN solutions WorldCom offers its 350 enterprise customers around the globe.

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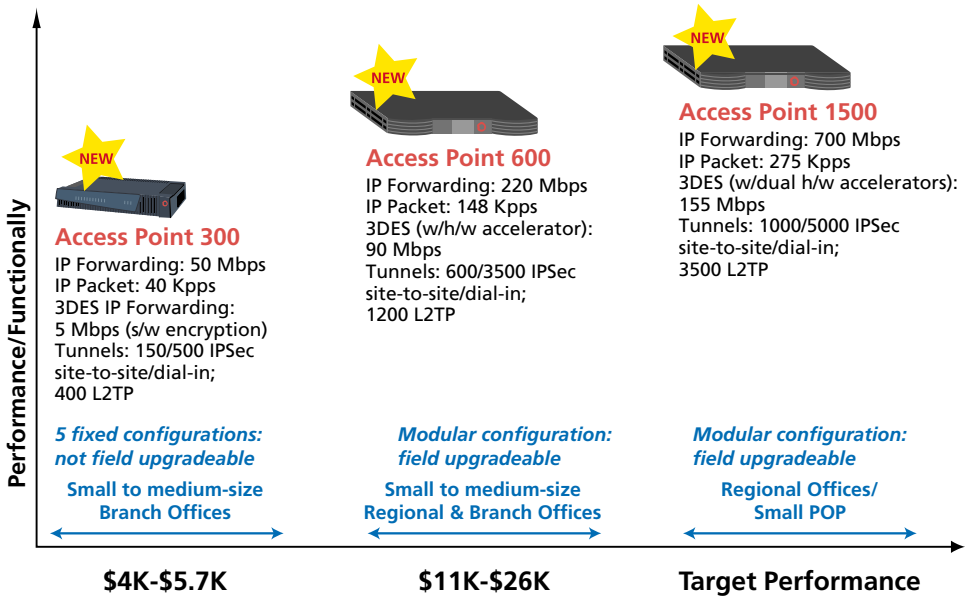
Access Point® Product Direction



With the addition of the Access Point 1500 by mid-2002, Lucent will offer a full range of new, third-generation CPE-based IP services routers.

The Access Point product family embodies Lucent's long-term strategic emphasis on support for service provider-managed CPE-based IP services.

As noted above, Lucent has recently introduced the Access Point 300 for small and medium branch offices, as well as the Access Point 600 for midrange applications at enterprise customers' regional office locations. Both of these products represent third-generation enhancements to the Access Point line.

By mid-2002, Lucent plans to expand the Access Point family with a new high-end product—the Access Point 1500. This will replace the Access Point 1000 with a platform that offers significant price/performance advances and enhanced functionality to address the needs of larger headquarters sites and small POPs.

The Access Point 1500 will be particularly valuable in enabling service providers to implement solutions for high-capacity data centers, as well as for large nodes in IP VPNs. It is expected to deliver data forwarding rates on the order of 700 Mbps and IP packet forwarding rates of up to 275,000 packets per second. And it will extend Lucent's high-end CPE platform leadership in the areas of IPSec and encrypted tunneling throughput.

With these additions, Lucent continues to set new price/performance standards across the full breadth of the Access Point portfolio. And Lucent reaffirms its commitment to help service providers deliver a comprehensive set of CPE-based IP solutions for a wide range of enterprise customers.

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