White Paper

Intelligent Networking: Deliver an Optimal Experience at Lower Costs

Regardless of the size of your branch offices, your remote locations now require the same network performance as the headquarters.

Applications are lifting to the cloud, the Internet edge is shifting to the branch, and new business requirements are swiftly straining both the corporate LAN and WAN. It's time to rethink your branch WAN strategy to simultaneously increase productivity, reduce costs, and help your business grow.

Enabling "full-service" branch-office capabilities across all of your remote sites is now more essential than ever. Historically, many branch offices were treated like "second-class citizens", receiving less-sophisticated and lower-performance network technology and IT services than the more prestigious headquarters. Only a few years ago, applications were centralized with data center consolidation-all tightly controlled and secure, but inherently slower and more latency-prone than local hosting on the LAN.

But the application landscape is changing with the consumerization of IT and the rise of user expectations. Almost overnight, businesses now expect every branch office to keep pace with the service and performance at the headquarters. The IT department is migrating applications into the public or private cloud to promote efficiencies. In addition, the Internet edge is moving to the branch office with the growth of Software-as-a-Service (SaaS) applications such as Cisco WebEx® meeting applications, Microsoft 365, and Google Docs. The IT organization is now under tremendous pressure to meet the growing bandwidth demands of cloud traffic, the proliferation of mobile devices, the adoption of the bring-your-own-device (BYOD) trend, and high-bandwidth applications such as video. The result is frustration for users from the strain on the WAN bandwidth-at a time when three out of four organizations have no additional WAN budget[1].

Per a Forrester survey[2], 86 percent of businesses have been unable to provision new services or support business demands because the network wasn't up to the task. Supporting all types of transport options and recognizing Internet as part of your WAN aggregation strategy appears to be a viable alternative to address both the IT budget and capacity challenges. Over the past decade the Internet has become a much more stable platform, and as WAN bandwidth demands increase, the price-to-performance gains become appealing. With this new trend, already 46 percent of businesses are in the process of, or are planning to, migrate their WANs to the Internet. Some are already running the Internet as a WAN at their smaller sites.

However, using the Internet as a WAN and multiple different transports is not without its own challenges. With no service-level agreement (SLA) and no redundancy, a business using the Internet[3] as a WAN is looking at nearly 9 hours of potential downtime a year-a number that, at peak seasons, can be devastating.

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[1] Nemertes Research, Benchmark 2012-13 Emerging WAN Trends

[2] "Building for the Next Billion; What the New World of Business Means for the Network", Forrester Consulting, October 2012

[3] Nemertes Research, Benchmark 2012-13 Emerging WAN Trends

Lowering Costs with Internet as a WAN

With the increased demand upon networks to support multiple services and technologies such as big data, cloud computing, mobility, virtualization, and social networking, traditional network designs have not been able to keep pace with the performance, security, and scalability required to deliver a superior end-user experience.

The Cisco® Intelligent WAN (IWAN) can keep pace with these requirements by enabling the IT organization to successfully transition to different types of WAN transports without compromising business compliance or the user experience. Cisco IWAN combines intelligent networking, integrated security, and end-to-end application service delivery across the network with the features offered by the Cisco Integrated Services Router Application Experience (ISR-AX) portfolio outlined in Table 1.

Table 1. Key Features of Cisco IWAN Powered by Cisco ISR-AX

Cisco IWAN Feature	How It Helps the IT Organization
Transport independence	• It provides the flexibility to support any type of transport options without compromising performance, reliability, or security. • Through IP Security (IPsec) VPN technologies, IT can transparently distribute branch-office traffic over any WAN transport, including the Internet, private Multiprotocol Label Switching (MPLS) WANs, third- and fourth-generation (3G and 4G, respectively) cellular, and others, while reducing complexity.
Secure Internet connectivity	• It enables direct Internet access using the Cisco Cloud Web Security (CWS) Connector for better SaaS application performance, protecting distributed branch-office endpoints while maintaining a centralized information security (infosec) policy management paradigm.
Intelligent path control	• It enables full usage of WAN bandwidth while protecting applications from temporary WAN oversubscription. • Through the Cisco IWAN Intelligent Path Control feature, applications are forwarded over the best-performing path(s) based on policy and adjusted dynamically when congestion or other problems degrade out of policy for an application. • Advanced load balancing distributes traffic efficiently to maximize expensive WAN bandwidth.
Application optimization	• It gives full visibility and control at the application level (Layer 7) through Cisco Application Visibility and Control (AVC) technologies such as Network-Based Application Recognition Version 2 (NBAR2), Flexible NetFlow IPFIX, and quality of service (QoS). • Cisco IWAN provides a view of the traffic running across the network, and enables IT to tune the network for business. • Wide Area Application Services (WAAS) applies advanced compression, de-duplication, and application-level acceleration to help applications perform better with the smallest load possible. • Cisco IWAN with Akamai Connect improves performance for web content by using the Akamai Intelligent Platform caching technology.

Cisco IWAN empowers the business to realize the cost benefits of provider flexibility and deploy new services faster over a variety of transport models. A proven solution with rich application and security services on a single platform, Cisco IWAN can scale to thousands of sites. In addition, IT can maintain granular control-from the branch office to the data center and out to the public cloud, by:

- Simplifying the network with transport independence for flexibility in choosing WAN circuits and quicker deployment
- Offloading guest and public cloud directly to Internet with secure and efficient transport (avoiding hairpins)
- Providing a high-quality experience to any device, regardless of where the application resides
- Quickly and efficiently delivering innovative services to employees, customers, and guests
- Prioritizing applications with granular control for growth in cloud traffic, device proliferation, and video
- Lowering the operational complexity with IT consolidation and a smaller branch-office footprint

Particularly well-suited for the branch office, the Cisco IWAN is a cost-effective, performance-enhancing solution. It enables the IT organization to deliver up to five-nines reliability over any transport: MPLS, the Internet, or hybrid WAN (MPLS + Internet) deployments.

Paving the Way to Branch Empowerment

Cisco IWAN dynamically routes the traffic based upon application, endpoint, and network conditions to help ensure the best user experience. With Cisco IWAN, the IT organization can roll out critical business services such as guest Wi-Fi, SaaS, and video without overwhelming the WAN. Cisco IWAN helps decrease operational costs and free IT organization budgets to promote more strategic initiatives within the business (refer to Table 2).

Table 2. Estimated Annual Savings for WAN Migration to the Internet for 100 Branch Offices in Major* Cities

	MPLS** Monthly Cost	Business Internet Monthly Cost	Estimated Annual Savings (US$)
6/30/2013 Snapshot	**MPLS VPN Cost with 10- and 1.5-Mbps Committed Data Rate (CDR)**	**Total Internet Cost with 10- and 1.5-Mbps CDR**	**Total Broadband Internet Costs with 10- and 3-Mbps CDR**
Americas			
New York	$1,175	$643	$638,400
Los Angeles	$1,141	$698	$531,600
Dallas	$1,191	$691	$600,000
San Francisco	$1,159	$737	$506,400
Atlanta	$1,178	$682	$595,200
Chicago	$1,226	$682	$652,800
Toronto	$1,748	$602	$1,375,200
Mexico City	$2,824	$1,778	$1,255,200
Europe			
London	$1,126	$545	$697,200
Frankfurt	$1,220	$577	$771,600
Paris	$1,251	$686	$678,000
Madrid	$1,324	$658	$799,200
Milan	$1,302	$580	$866,400
Brussels	$1,259	$689	$684,000
Asia Pacific			
Hong Kong	$1,793	$894	$1,078,800
Beijing	$6,018	$3,173	$3,414,000
Tokyo	$2,101	$976	$1,350,000
Sydney	$3,140	$2,424	$859,200
Melbourne	$3,259	$2,711	$657,600
Auckland	$3,768	$2,968	$960,000
Mumbai	$5,342	$3,204	$2,565,600

Assumes migration from dual MPLS VPN to dual Business Internet

* Telegeography Data assumptions, June, 2013

** MPLS is for class of service level 2 (CoS2) VPN services providing real-time data and middle priority

Cisco IWAN provides an uncompromised experience over any connection with the Cisco ISR-AX, Cisco ASR 1000-AX Aggregation Services Routers with Application Experience, and Cisco Cloud Services Router 1000V (CSR 1000V) for the cloud. All are operationally scalable, attractively priced solutions that include security, policy, and application services necessary to deliver a high-quality experience. These router upgrades help the IT organization to right-size its network by augmenting premium WAN connections to the low-cost Internet, and use its WAN investments more effectively. The typical savings for a 100-site enterprise is between US$500,000 and US$3,000,000 annually, and in some regions it can go up to $7,000,000 annually.

The Cisco 4000 Series Integrated Services Router family, part of the Cisco ISR-AX portfolio, enhances branch-office networking with an award-winning architecture to deliver a full-service converged platform, built to meet growing user expectations for a smooth application experience on any device, over any connection, from any cloud.

Table 3 lists Cisco IWAN Differentiators.

Table 3. Cisco IWAN Differentiators

Differentiator	Cisco Is the Only Vendor That Offers:	Benefit
Operational simplicity	• A single integration platform, which includes advanced routing, WAN path selection, application visibility and control, WAN optimization, the firewall, and the IPsec VPN gateway	• Savings of up to 72 percent • Ease of management
Pervasive services	• Consistent services and granular control pervasively across the network • The Cisco ISR-AX (for the branch office), the Cisco ASR 1000-AX (for the data center), and, as the business moves to become cloud-enabled, the Cisco CSR 1000V (for the cloud).	• Consistent management and service delivery at all locations
Security at scale	• Any-to-any security with a fully meshed network • Threat defense services that protect the branch-office resources without managing client agents on endpoints	• Support for thousands of sites • Secure direct Internet access against threats
Context-based routing	• Application-aware, endpoint-aware, and network-aware context-based routing; for example, the router understands that a smart phone is on a web conference, and if there is network congestion, it can reroute to ensure business continuity and a high-quality experience	• Ability to make dynamic, real-time decisions

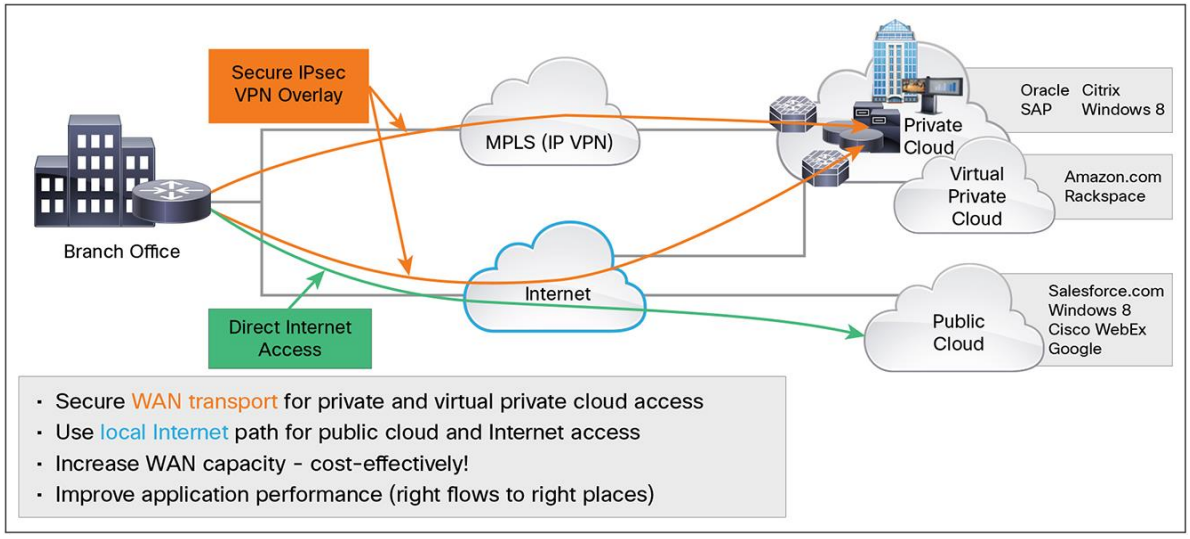
All of these features add up to significant cost savings without compromising performance, reliability, or security. Cisco ISR-AX is the only router refresh that pays for itself, and many businesses receive a return on investment in less than a year.

How to Deploy Cisco IWAN

Businesses can use IWAN to take advantage of the Internet without compromise for accessing private, virtual private, and public clouds, independently or together (refer to Figure 1).

- For private and virtual private cloud access: Secure IPsec VPN is used, by using the Internet as WAN transport for a highly reliable solution while protecting application performance.
- For public cloud and Internet access: User traffic is directed to the local Internet connection for a more efficient path to a public cloud and secure Internet services.

Figure 1. Cisco IWAN with Both Private and Public Clouds



Private and Virtual Private Cloud Access

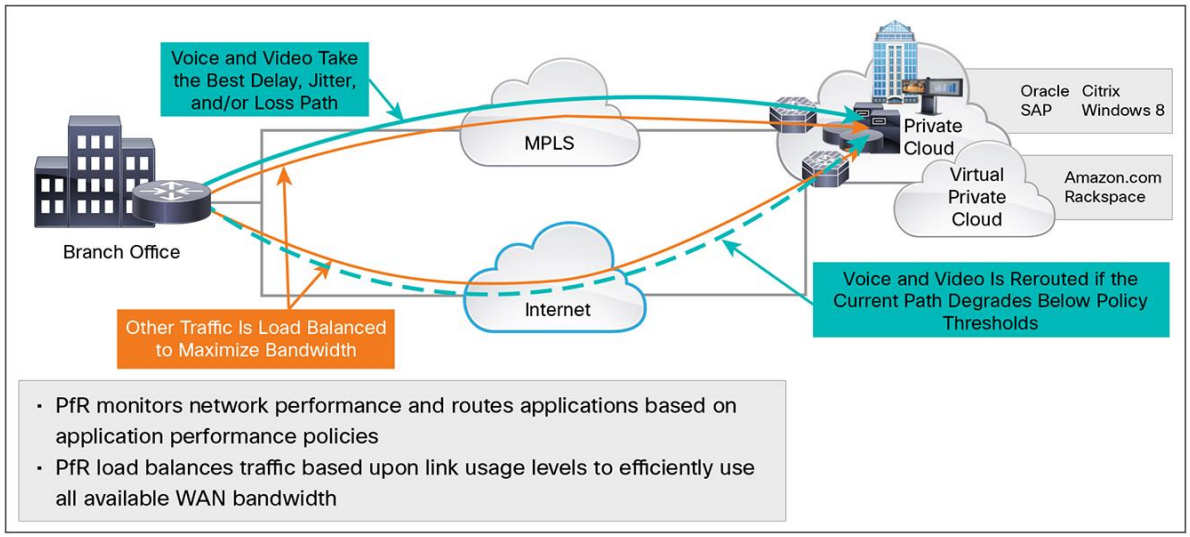
Cisco IWAN for private and virtual private cloud access consists of:

- Transport-independent design
- Security at scale
- Intelligent Path Control
- Application Performance Optimization

Transport-independent design simplifies the WAN design by using an IPsec VPN overlay over all WAN transport options including MPLS, Internet, and 3G and 4G cellular. The single VPN overlay reduces routing and security complexity, and provides flexibility in choosing providers and transport options. Cisco Dynamic Multipoint VPN (DMVPN) provides the IWAN IPsec overlay. Two or more WAN transport providers are recommended to increase network availability up to 99.999 percent.

Intelligent Path Control with Cisco Performance Routing (PfR) improves application delivery and WAN efficiency. PfR protects business applications from fluctuating WAN performance while intelligently load balancing traffic over all WAN paths. PfR monitors the network performance to forward critical applications over the best-performing paths based on the application policy for delay, jitter, and packet loss. PfR advanced load balancing evenly distributes traffic to maintain equivalent link usage levels, even over links with differing bandwidth capabilities. Cisco IWAN Intelligent Path Control is key to providing a business-class WAN over Internet transports (refer to Figure 2).

Figure 2. Cisco IWAN Intelligent Path Control



Application performance optimization is provided by Cisco AVC and Cisco WAAS. With applications becoming increasingly “opaque” (because of increased use of HTTP-based applications), static port classification no longer suffices. Optimizing application performance is accomplished by making the IWAN application-aware. Cisco IWAN does this task with deep packet inspection of traffic to identify and monitor application performance. With increased visibility into the applications on the network, better QoS policies can be enabled and fine-tuned to help ensure that critical applications are properly prioritized across the network. Cisco WAAS provides application-specific acceleration capabilities that improve response times while reducing WAN bandwidth requirements. Cisco IWAN with Akamai enables business and IT to engage customers and improve employee productivity by providing an optimal user experience over bandwidth-constrained networks within the Cisco WAAS software.

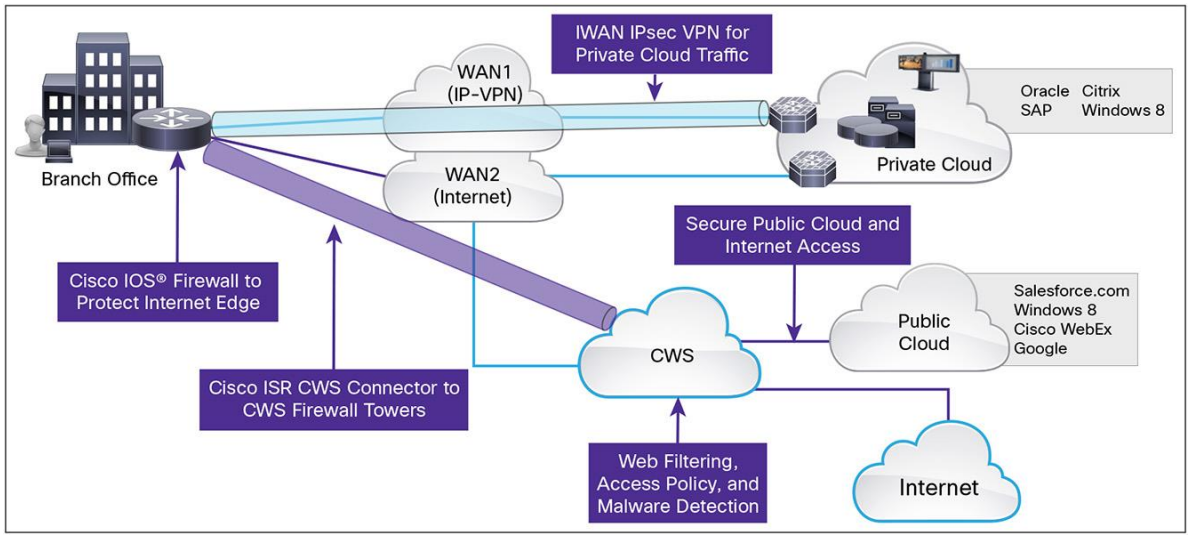
Public Cloud and Internet Access

Public clouds are delivering business applications that are accessible through the Internet. Direct Internet access is used to offload the WAN of Internet traffic to more efficiently access public cloud and Internet resources. The process involves:

- Securing the perimeter of the corporate network from Internet threats with local firewalls and intrusion prevention systems at the branch-office location.
- Securing user traffic with Cisco CWS. The CWS connector, available in the Cisco ISR-AX router, enables businesses to split security services between on-premises and the cloud. It acts as an HTTP proxy to complete requests and scan for malware, and allows, blocks, or warns based on the user, group, or business policy. These policies are centrally managed in the cloud.

Combining these elements improves application performance securely by directing the right flows to the right places (refer to Figure 3).

Figure 3. Securing Internet Access by Appropriate Flow Direction



Cisco IWAN provides granular control everywhere, proven security at scale, unmatched context-based routing, and quick return on investment (ROI). Cisco ISR-AX provides industry-leading routing and security with a comprehensive suite of application services that provides visibility, control, and optimization.

Conclusion

The Internet edge is moving to the branch as a result of changing user requirements and price/performance economics. IT faces greater challenges as a result of applications moving to the cloud, the onset of business mobile devices, BYOD, and guest access and high-bandwidth video applications that strain the corporate Wi-Fi and WAN resources. Cisco IWAN delivers an uncompromised user experience over any connection, allowing the business to create an agile network with operational simplicity and lower costs. Now, IT can take full advantage of its WAN investments with high performance, reliability, and security, implementing IWAN through the Cisco ISR-AX, ASR 1000-AX, and CSR 1000V routers in the branch office, data center, and cloud, respectively.

For More Information

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San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
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The Netherlands

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