Cisco ISR 4451-X Converged Branch Infrastructure: Do More with Less

What You Will Learn

In recent years, innovation in networking, virtualization, compute, and storage technologies has allowed IT organizations to streamline and scale in the global marketplace by centralizing resources in the data center and cloud. However, the benefits of centralization have resulted in greater complexity in the branch office, where IT has had to compensate for poor application performance over the WAN. This situation has contributed to rising capital and operational expenditure, not only reducing IT productivity but also stifling business agility, flexibility, and innovative abilities.

This paper discusses how you can support a distributed enterprise with lean IT through consolidation of servers, storage, and networking resources that can be shared by multiple applications and managed collectively using policy-led processes.

Challenge

Businesses are using next-generation applications to innovate, increasing rich-media video and high-definition digital content across the network. Research shows that 82 percent of chief marketing officers (CMOs) feel unprepared for the data explosion, up from 71 percent in 2011 (IBM Cloud Survey, 2013). Likewise, 68 percent of IT decision makers say that demands for bandwidth will increase (Cisco Global IT Impact Survey, 2013), yet three out of four organizations will not have additional WAN budget (Nemertes Research, 2013).

Nowhere is this data explosion more acute than in the branch office, where users feel the greatest impact of rich content struggling to be delivered over bandwidth-constrained networks. IT needs to rethink its network strategy for a distributed enterprise that can be supported with lean IT. As a result, an increasing number of companies are looking at the benefits of a single, optimized platform that IT organizations can use to centralize the management of IT resources, consolidate systems, increase resource usage rates, and lower costs. Business teams within the company are also benefiting from this consolidated architecture as with increased flexibility and innovation opportunities.

Business Benefits: Branch-Office Sophistication with Lean IT

The Cisco® 4451-X Converged Branch Infrastructure solution addresses the problem of siloed architectures and IT sprawl by consolidating various IT appliances and services. Rather than dedicating a set of resources to a particular service function, application, or line of business, converged infrastructures creates a pool of virtualized server, storage, and networking capacity that is shared by multiple applications and lines of business.

CIOs continue to seek ways to simplify IT systems management and reduce support costs across the extended data center footprint. Cloud, mobility and video are driving up WAN bandwidth requirements, and as a result, IT needs network-wide visibility and control to implement meaningful application policy enforcement to deliver a great user experience.

Total cost of ownership (TCO)

Analyst research indicates that over the full deployment lifecycle of a network, the initial cost of buying equipment is relatively the smaller part (20 percent) of the TCO compared with the ongoing operational costs (80 percent). Cisco ISR platform achieves as muchas a 40% reduction in operational cost when compared with traditional or legacy router and switch infrastructure. The TCO savings accrue from:

- Protecting revenues with highly available services

- Improving employee productivity

- Reducing downtime (planned and outages)

- Reducing the number of maintenance contracts

- Consolidation of virtualized workloads onto fewer x86 servers

- Reducing the facilities impact – cooling and power

- Reducing the cost to deploy

- Simplifying network management processes and tasks

Solution: Cisco ISR 4451-X Converged Branch Infrastructure

Cisco ISR 4451-X Converged Branch Infrastructure is a platform for innovation that integrates world-class network, compute, and storage to deliver unprecedented performance and power in an all-in-one box solution at an unbeatable total cost of ownership (TCO). The solution includes the Cisco 4451-X Integrated Services Router (ISR), Cisco Unified Computing System™ (Cisco UCS®) E-Series blade server, and a Cisco 24-port switch module. Together, these components provide up to 2 Gigabits of raw performance with data center–class compute power of up to 6 core processors, 16 GB of RAM, 2 TB of local storage, and industry-leading Cisco Catalyst® switching with full Power over Ethernet (PoE+) support (refer to Figure 1).

Figure 1.   Cisco 4451-X Converged Branch Infrastructure Solution: Networking, Compute, and Storage

This platform delivers the most significant advancements in branch-office routing since the introduction of the Cisco ISR Family in 2005, offering a world-class architecture that separates the data, control, and service planes to deliver the broadest set of Layer 2 through Layer 7 services natively on a branch-office router without trade-offs in performance, security, and management. The platform provides customers a true pay-as-you-grow model for performance and network services for better investment protection and future scalability. And, with the future in mind, the virtual services framework enables rapid service integration for new innovations.

Using this new world-class platform, we are delivering the Cisco 4451-X Converged Branch Infrastructure solution to support the most demanding high-end branch-office environments. This solution brings together the greatest advances in routing, security, wireless, and compute to provide an all-in-one-box solution that can support a full-service, secure branch office capable of gigabit service performance without compromise. Services include:

- Advanced routing
- Integrated switching with PoE+
- Secure VPN and threat defense
- Application Visibility and Control (optional)
- WAN path control (optional)
- WAN optimization (optional)
- Wireless LAN (WLAN) Controller (optional)
- Open compute environment with multihypervisor support

Intelligent Networking that Is Unmatched in the Industry

The Cisco 4451-X Converged Branch Infrastructure solution offers several features that are unmatched in the industry:

- **Platform architecture**—separate data, control, and services planes: This industry-first architecture provides a new level of processing power for network traffic that will be critical for the explosion of devices and rich-media content on the network and the projected demands of the Internet of Things (IoT).
- **Services architecture**—service containers for high-availability services: This additional first in the industry offers an integrated virtualization layer within the router for hosting complex network services that helps ensure that no individual service can bring down other critical functions in the router. This architecture allows customers to roll out more services while increasing overall availability.
- **Flexible deployment**—pay-as-you-grow performance and services (including pay-as-you-grow compute services): This solution allows you to pay for only the capacity and capabilities you need **today** and then upgrade to what you need **tomorrow** with no new hardware.
- **Performance**—raw performance with Multigigabit Fabric (MGF): The solution delivers high performance without compromise. This platform is the only platform in the industry that can handle traffic within the branch office with zero impact on traffic leaving the branch office.
- **Infrastructure convergence**—all-in-one platform for network, compute, and storage in a 2-rack-unit (2RU) form factor: This platform is built to offer a converged infrastructure delivering the most popular branch-office features and services to the customer with routing, switching (wired and wireless), compute, storage, security, application recognition, voice, and WAN optimization—all within one physical platform—providing the greatest breadth of services in the industry.

- **Integrated switching**—Layer 2 and 3 capabilities on one platform: The Cisco 24-port Etherswitch module is the only integrated switch to provide MACsec, Cisco TrustSec® security, and PoE+ on all ports at line rate.

Why Cisco?

With the Cisco 4451-X Converged Branch Infrastructure, IT can more easily support a distributed enterprise architecture with growing demands at the branch office from employees, suppliers, and end customers, while still maintaining a lean IT with operational simplicity and lower total costs. A single platform can not only take care of IT's increased bandwidth needs and security but also can minimize space, power, and cooling requirements for the branch-office infrastructure. Best of all, IT can pay for the performance and services needed today, and have the headroom to expand capabilities as the business requirements change, without replacing any hardware.

The solution also allows IT to add software upgrades for a wide variety of WAN and LAN services, including security and application services. IT can concurrently run multiple services that help customers more effectively use their WAN investment and get more value. For example, the solution enables visibility onto the network without adding probes. Now IT can see traffic at Level 7 (differentiating all HTTP traffic types, for example) and make more informed decisions on either application prioritization and/or capacity planning. In addition, the solution provides WAN path-control functions, so customers can better use all their WAN connections (Multiprotocol Label Switching [MPLS], Internet, cellular, etc.). The router understands the health of all lines and can determine if the quality thresholds can be met for real-time applications such as video, and reroute through an alternative path if required. This capability provides improved business continuity of critical applications. Our optimization services can further accelerate application traffic. Customers have seen increases in effective bandwidth capacity from two to four times more than without optimization, providing more headroom for new traffic demands. With the Cisco 4451-X architecture, these and other services can run together without compromise.

In addition, the compact 2RU form factor takes alternative solutions that can require up to 8RUs to support multiple services on different appliances down to just 2RUs. This consolidated platform can save hundreds of thousands of operating expenses on power as well as eliminate the cost of sending technicians to stores to install or update routers or servers. By providing complete branch-office infrastructure in a quarter of the space, the Cisco 4451-X frees more real estate to dedicate to other business functions. Customers also have the flexibility to quickly add new IT services such as sales analytics, digital signage, or customer behavior analysis without the time and costs of adding physical servers. IT no longer slows down the speed of business.

Finally, network uptime is greatly improved with a redundant platform while support costs are brought down with integrated hardware support in a single platform.

For the first time in a branch-office router, customers have multiple choices in computing within the branch office. The Cisco 4451-X provides an integrated virtualization environment ideal for running network services in the router without compromise or any additional hardware. When additional computing power is needed, the Cisco UCS E-Series modular server adds data center–class server functions to the branch office fully integrated with the branch-office services provided by the Cisco 4451-X. This architecture allows IT to select and then optimize the best method of delivering applications to end users; for example:

- Integrated open compute environment for apps that must be delivered locally, from file/print to point-of-sale to video surveillance

- Application-level quality of service (QoS) and Cisco Cloud Web Security connector for software-as-a-service (SaaS) apps delivered from the public cloud, including applications such as Cisco WebEx® and Salesforce.com
- WAN optimization and application acceleration for centralized apps delivered from the private cloud or enterprise data center, including applications such as SAP and virtual desktops

As IT teams prepare their branch-office environments for the future, many will quickly find that the Cisco 4451-X Converged Branch Infrastructure is a must for keeping pace with business requirements with IT scalability and simplicity.

Table 1. Ordering Info

Part Number	Description
ISR4451-UCSE-S/K9	Cisco ISR 4451 CI Bundle w 24 port SM, UCS-E Single Wide SM

For More Information

For more information about the Cisco 4451-X Converged Branch Infrastructure solution, please visit:

- Cisco.com/go/4400
- Cisco.com/go/ucse
- Cisco.com/go/etherswitch

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