



Cisco's ISR 4451-AX Powers the Evolution of the WAN

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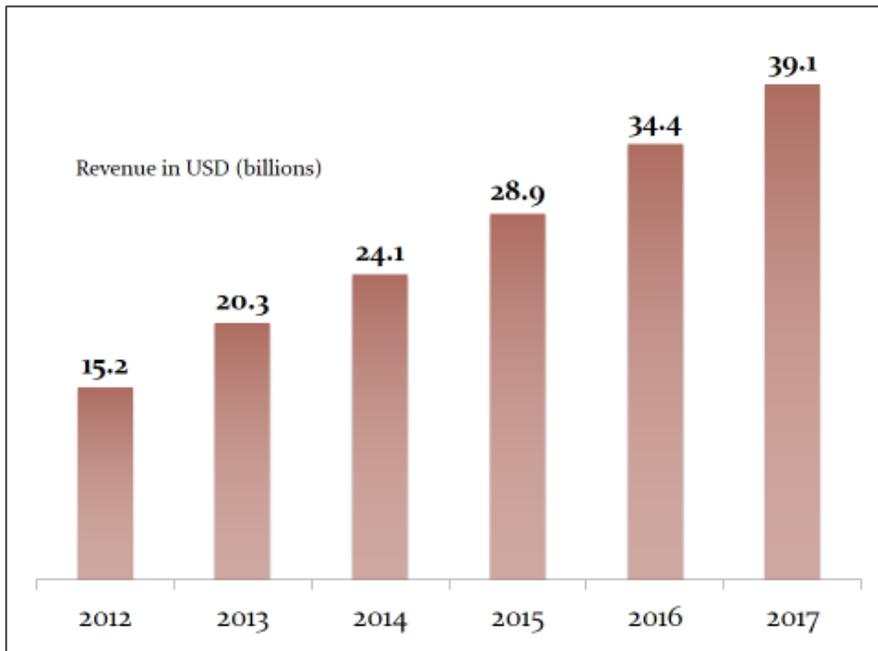
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Introduction: The Time for WAN Evolution is Now

IT has gone through a significant evolution over the past decade. Virtualization has changed the entire face of the data center, the network edge has become predominantly wireless and consumer devices reign supreme. However, one of the few areas of IT that has yet to evolve is the corporate wide area network (WAN). Managing the WAN is something network managers have always struggled with, since WAN speeds are typically an order of magnitude, or more, lower than local area networks (LANs).

Historically, while not ideal, WANs met the needs of the enterprise as many mission-critical applications were deployed locally, and WAN-based applications were best-effort in nature. Today, the model has changed. Companies are adopting network-centric compute models such as cloud (Exhibit 1) and mobile computing, which raises the value and importance of the corporate WAN. In addition, the significant rise in video, VoIP and virtual desktop traffic drives the need to evolve.

Exhibit 1: Global Software-as-a-Service Forecast



Source: ZK Research, 2013

As application performance becomes more dependent on the network, application delivery requires IT to be more network-centric. For this to happen, the network must shift from a tactical resource to a strategic asset that will play a key role in IT success. However, for the WAN to achieve this level of strategic importance, it must evolve.

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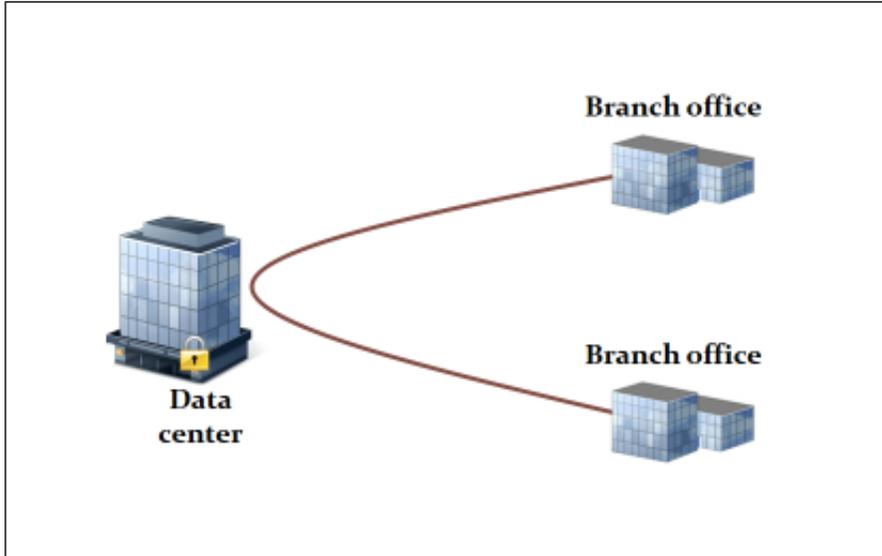
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Section II: Limitations of Legacy WANs

The current WAN architecture was implemented a decade or so ago for delivery of client/server computing and best-effort Internet traffic. Cloud and mobile computing are the fastest growing application segments today and drive significantly different traffic patterns than the legacy (LAN-based client/server) compute model. WANs have the following limitations:

- **Inefficient use of network bandwidth:** Business WANs are typically designed with a hub-and-spoke architecture. Each branch is connected only to the central hub for connectivity. All traffic is sent over the WAN, through a central location and then to its destination, whether it's the Internet or another branch location. This trombone effect is highly inefficient, as all traffic must pass through a single choke point.

Exhibit 2: The Trombone Effect of WAN Traffic



Source: ZK Research, 2013

- **Lack of application visibility and control:** Improving user experience and application performance has been a challenge for network managers responsible for WANs. A high level of visibility into the network enables network managers to better understand how applications perform. Based on visibility, applications can be controlled in various ways depending on criticality to the business.
- **Complexity of infrastructure:** Branch offices require many technologies to be a secure part of the corporate network. This includes routers, WAN optimization devices and servers. These are often deployed using multiple platforms, creating a highly complex environment.
- **Security deployed as an overlay technology:** With legacy networks, securing the network was accomplished by deploying security tools as an overlay to network technologies. This makes it difficult to keep security policies aligned with network policies.

Challenges associated with legacy networks are significant today, as companies look to migrate their IT strategies. It's critical that CIOs and other IT leaders make evolving the WAN a top priority.

“Leveraging the cloud was one of the critical initiatives for our company’s five-year IT vision. We will move aggressively to the cloud to get a leg up on our competition.”

– CIO, Nationwide Retailer

Section III: It's Time to Evolve the WAN

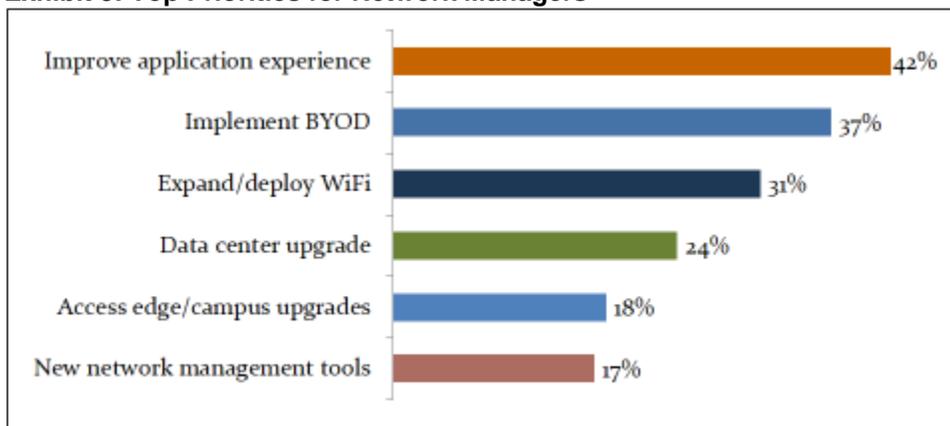
IT trends drive WAN evolution. The network needs the same level of attention as compute or application resources. However, the future is not yet clear. Below are key points to consider when architecting a WAN — for today and the next decade.

- **Optimize for cloud and mobile computing:** Legacy WAN thinking must be shed to support the needs of an increasingly consumerized, cloud-driven and mobile business. Hub-and-spoke architecture must give way to greater meshing and local Internet access.
- **Integrate security into the network:** WAN optimized for future applications must protect the enterprise in new ways and at multiple points. Security must be integrated with the network to provide maximum protection.
- **Application-aware networks:** To optimize application performance, the network must recognize certain types of applications and apply the right optimization techniques. This ensures all users a consistent experience.
- **Application platform:** The network must provide capability for applications to be more network-aware. The network must be an application platform, and tightly couple applications to the network. The ability to deploy applications anywhere in the network without compromising performance and security will increase agility.
- **Pervasive visibility:** A key to optimizing user experience is understanding how the network impacts applications. Network managers must have more visibility to set thresholds, find bottlenecks and prioritize applications.
- **Rapid provisioning of applications and network services:** The business environment continues to get more competitive. Gaining an edge means being able to deploy applications and services across the network faster. The network must be an enabler of rapid provisioning, instead of an inhibitor.
- **Optimize user experience and mobility:** Fulfilling the vision of cloud and mobile computing is imperative. In fact, a 2013 ZK Research study shows (Exhibit 3) improving application performance is the top concern of network managers. The infrastructure that powers the network must evolve.

“Shifting IT control points to the network is the only scalable way we can migrate our applications to the cloud without putting the business at risk.”

*– CIO, Mid-Atlantic Based
Financial Services Firm*

Exhibit 3: Top Priorities for Network Managers



Source: ZK Research, 2013

Section IV: Cisco ISR 4451-AX: Purpose Built for WAN Infrastructure

Branch offices and the WAN are in a state of transformation. Network managers must strike a balance between maintaining the status quo and pushing forward with strategic IT projects. However, the complexity of current infrastructure means network managers spend almost all of their time keeping the lights on. To help shift the balance to the network as a strategic platform requires a new approach to branch networks.

Cisco's Integrated Services Router (ISR) elevates the concept of the branch router. The ISR is a single device that is easy to use and manage, which provides customers with combined data, security, UC and wireless services.

The ISR-AX branch routers takes the ISR concept and adds higher-level (layer 4 to 7) services. It can be thought of as a purpose-built network and application platform that delivers an optimized user experience. The ISR-AX combines traditional layer 2 and 3 services such as routing and security with layer 4 to 7 application services for greater visibility, control and WAN optimization.

This new ISR platform redefines branch routing and WAN connectivity, and enables companies to leverage mobile and cloud computing. The ISR 4451-AX is Cisco's latest ISR-AX product and combines high-performance branch routing with scalable service delivery and simplified IT operations in a 2-RU form factor. Despite the compact form factor, it has leading-edge performance, with 2 Gigs of forwarding performance. The ISR 4451-AX is a leading network and security product but also brings compute capabilities to the branch office, such as servers and storage, with integration of Cisco UCS E-Series Server blades. Companies that leverage the ISR 4451-AX will realize the following benefits:

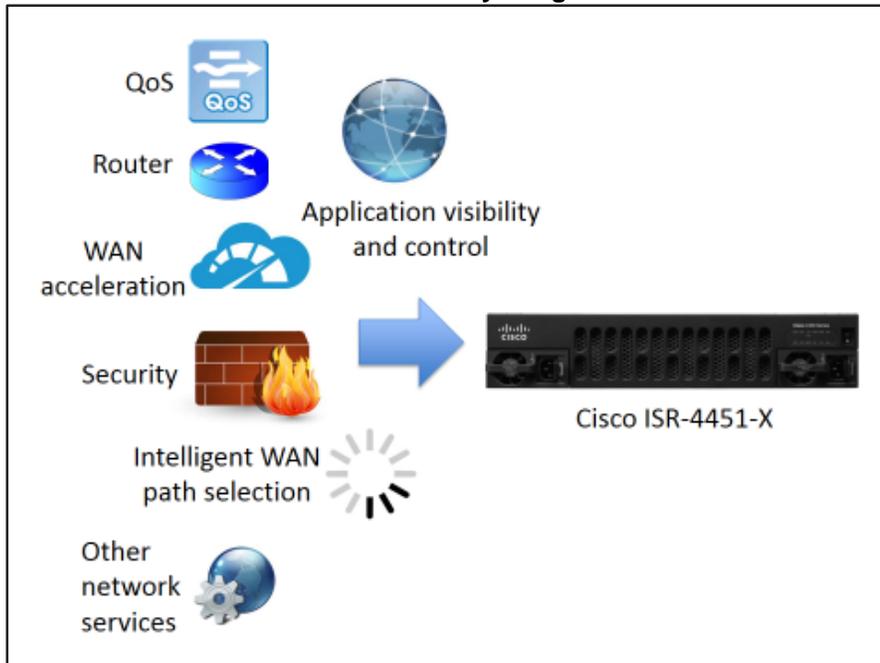
- **Pay-as-you-grow deployment model for network services:** The ISR 4451-AX has all of its services natively integrated on the platform, which can be enabled via a simple license key. This means minimal downtime and disruption to the business with no truck rolls. Unlike many integrated platforms where an increase in breadth-of-service means a decrease in performance, the ISR-4451-X has separated control, services and data planes and runs the individual services in separate containers. This separates and containerizes new services to be provisioned without affecting the performance of services already running.

- **Faster time-to-market of network and application services:** The pay-as-you-grow model means IT organizations can add new network services quickly. IT departments can respond to business requests immediately, allowing real business agility.
- **Unmatched TCO:** It's common to see branch offices with separate devices for security, WAN optimization, routing, performance and other branch functions. The ISR 4451-AX has all branch services natively integrated and optimized with hardware performance, for best-in-class performance across all services (Exhibit 4). This offers TCO advantages through hardware consolidation and operational simplicity.

“Optimizing the performance of our traditional, cloud and mobile applications across our end-to-end network has become one of the most important tasks for network operations. This has a direct impact on user productivity.”

*– Head of Network Operations,
Global Law Firm*

Exhibit 4: The ISR 4451-AX Offers Fully Integrated Services



Source: ZK Research, 2013

- **Consistent user experience:** The ISR-4451-X is loaded with natively integrated application optimization features such as application visibility and control (AVC) and WAN optimization (WAAS) to ensure users have a LAN-like experience even when accessing applications over the WAN.
- **Optimization of real-time applications:** The new router's features optimize performance of real-time services such as VoIP and video. It supports SIP, has an integrated session border controller (SBC) and also provides voice-quality management for benchmarking. Network managers can provision intelligent paths as well as QoS to ensure performance of real-time services is not impacted by other traffic.
- **Integrated security:** Network managers can provision traditional network security features such as IPsec VPNs, and application-level security-like zone-based firewalls and cloud Web security. An integrated, multifaceted security is crucial in securing business applications while increasing business agility.
- **Open, programmable network:** Software defined networks (SDNs) have dominated the media during the past 24 months. However, most organizations are unsure how to leverage SDNs. The Cisco ISR 4451-AX goes well beyond SDNs and brings a level of openness

and programmability to the network as a core element of the Cisco Open Network Environment (ONE) and Cisco ONE Enterprise Networks Architecture. Cisco has enabled a rich set of open, programmable APIs with its programming interface, onePK. This ultimately leads to faster application and service provisioning across the enterprise network.

- **Future proofs the WAN:** With 2 GB of performance and native services, companies can leverage the ISR 4451-AX platform today and keep it in place for the foreseeable future. The product offers outstanding value as an enabler of WAN services, and also provides investment protection, as it will not need to be replaced for future services.

Legacy infrastructure often means network managers must compromise one or more important elements, such as cost, performance, security or manageability. Given rapidly changing business and network environments, it's critical IT leaders choose a platform where the services can scale with the business and still offers state-of-the-art security that is affordable and manageable. The ISR 4451-AX is the right platform to enable companies to harness business opportunities today, with a branch router that delivers the functionality to meet IT challenges today and into the future.

Section V: Conclusion and Recommendations

The nature of work is changing, and organizations want to leverage the flexibility and power of mobile and cloud computing. While these compute models are very powerful, they are the most network-centric compute paradigms to date. The corporate network can no longer be thought of as a tactical resource or cost center. Business leaders, CIOs and IT leaders should consider the network a strategic asset which will play a significant role in enabling companies to rapidly respond to the new business opportunities and efficiencies of the cloud and mobile era.

However, to reach this level of strategic value, the corporate WAN must evolve into an enabler of application experience and network services. A successful WAN evolution depends on the right architecture, but also a next-generation network platform capable of delivering all of the branch services with uncompromised security and performance. Cisco's ISR 4451-AX is ideally suited to meet the challenges of today and the future, and should be considered as a building block for any company looking to leverage the WAN for strategic value. To successfully build a next-generation WAN, ZK Research recommends the following:

- **Take an architectural approach to building the WAN:** A network is more than a collection of routers and other devices. An architectural approach ensures the network can not only connect users to resources, but can also ensure a high quality, optimized user experience with a lower TCO than a nonarchitectural approach. Cisco ONE and Cisco ONE Enterprise Networks Architecture enable enterprises to evolve the WAN with minimal risk.
- **Invest in the network now:** Any organization even thinking about cloud and mobile computing should invest in the network to ensure the foundation is there to transition to the enterprise — no matter what speed the business wants to move forward. It's critical companies choose infrastructure that can enable the proper level of network intelligence, security and application intelligence to enable a quality user experience, rather than using network infrastructure that is simply good enough. When it comes to the network, a good enough network is no longer good enough.

- **Leverage the network for computing success:** Legacy network thinking needs to go. Computing success is highly dependent on the network. Business and IT leaders need to consider the network when planning any kind of IT initiative. Focusing on the WAN will create the most secure and lowest-risk deployment strategy for future applications and network services.