



# **Top Five Considerations for Building a Cloud-Ready Network for Distributed Enterprises**

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**ZK Research**  
*A Division of Kerravala Consulting*

## Introduction: The Cloud Redefines the WAN

IT has evolved more in the past half-decade than in any other five-year period before it. Virtualization has completely changed the face of the data center, mobile devices have shifted the access edge to being predominantly wireless, and consumer devices now dominate the workplace. However, one of the few areas of IT that has yet to evolve is the business wide-area network (WAN). As distributed organizations strive to become more agile, the WAN will need to evolve to keep pace with the rest of IT.

The architecture used to build traditional WANs has now been in place for almost three decades. This legacy design was not ideal but sufficient when all of an organization's mission-critical applications and data resided in either a branch office or the company data center. The best-effort, rigid nature of traditional WANs may have been fine in the era of client/server computing, but the rise of cloud computing makes the evolution of the WAN a top mandate for IT leaders.

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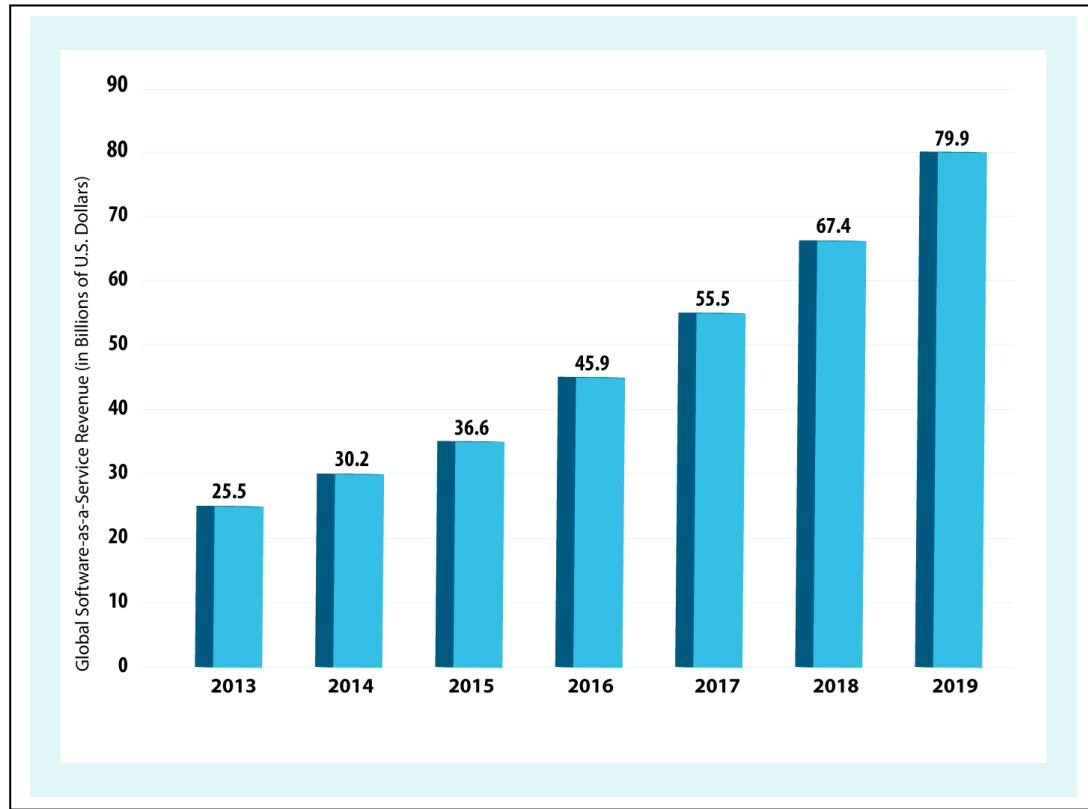
"Cloud computing" is a very broad term, and it includes the ability to purchase compute resources such as servers and storage from a service provider. However, the segment of the cloud computing market that is having the most significant impact on the WAN is the software-as-a-service (SaaS) market. The SaaS model enables businesses to purchase business applications directly from a service provider. The SaaS segment has been the fastest-growing portion of the cloud computing market. ZK Research forecasts that the global SaaS market will grow from \$25.5 billion in 2013 to \$79.9 billion in 2019 (Exhibit 1).

Cloud is a network-centric compute paradigm, and the network plays a key role in the performance and security of cloud applications. The "good enough" performance of traditional WANs will not be good enough for cloud applications. Although industry experts have theorized about the need to redesign the WAN for decades, the shift never had a driving force like cloud computing. If businesses are to maximize their investments in cloud computing, building a network that is cloud ready must be an imperative.

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SaaS is an excellent computing model for distributed organizations. Today, ZK Research estimates that 82% of workers reside in a location other than the corporate headquarters. The ubiquitous reach of cloud applications makes this delivery model ideal for a workforce that is highly mobile and distributed.

### Exhibit 1: SaaS Revenue to More than Triple from 2013 to 2019



Source: ZK Research, 2015

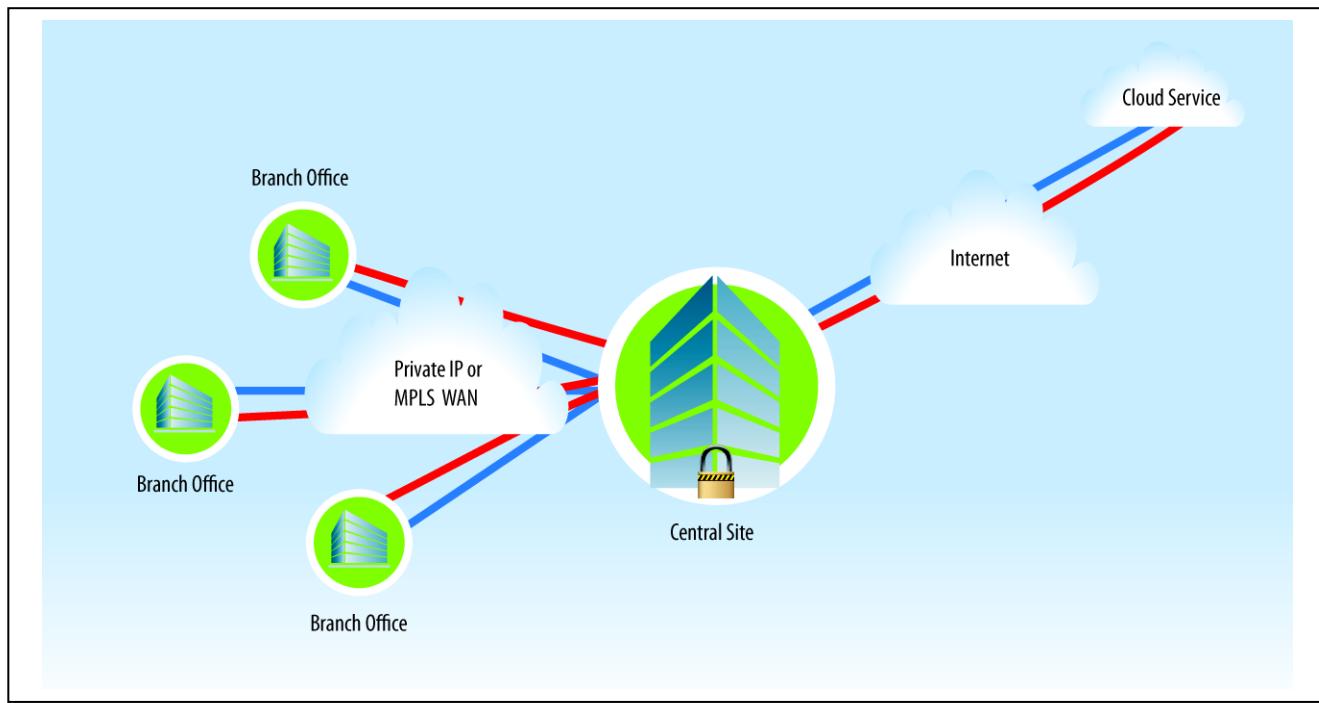
## Section II: Limitations of the Legacy WAN

The current WAN architecture was implemented a decade or so ago for the delivery of client/server computing and best-effort Internet traffic. Cloud has become the fastest-growing application segment today, and it drives significantly different traffic patterns compared to the legacy compute models. Because of this change, the WAN now has the following limitations:

- **Inefficient use of bandwidth:** With the traditional “hub and spoke” model, Internet traffic is backhauled over a high-cost network, such as MPLS, to reach the branch office (Exhibit 2). If data needs to be sent back, then the traffic “trombones” from the branch office, across the WAN and out to the Internet. Moving traffic over the private WAN twice is a poor use of bandwidth and can drive costs up. This can be particularly problematic with higher-cost services, such as Ethernet.

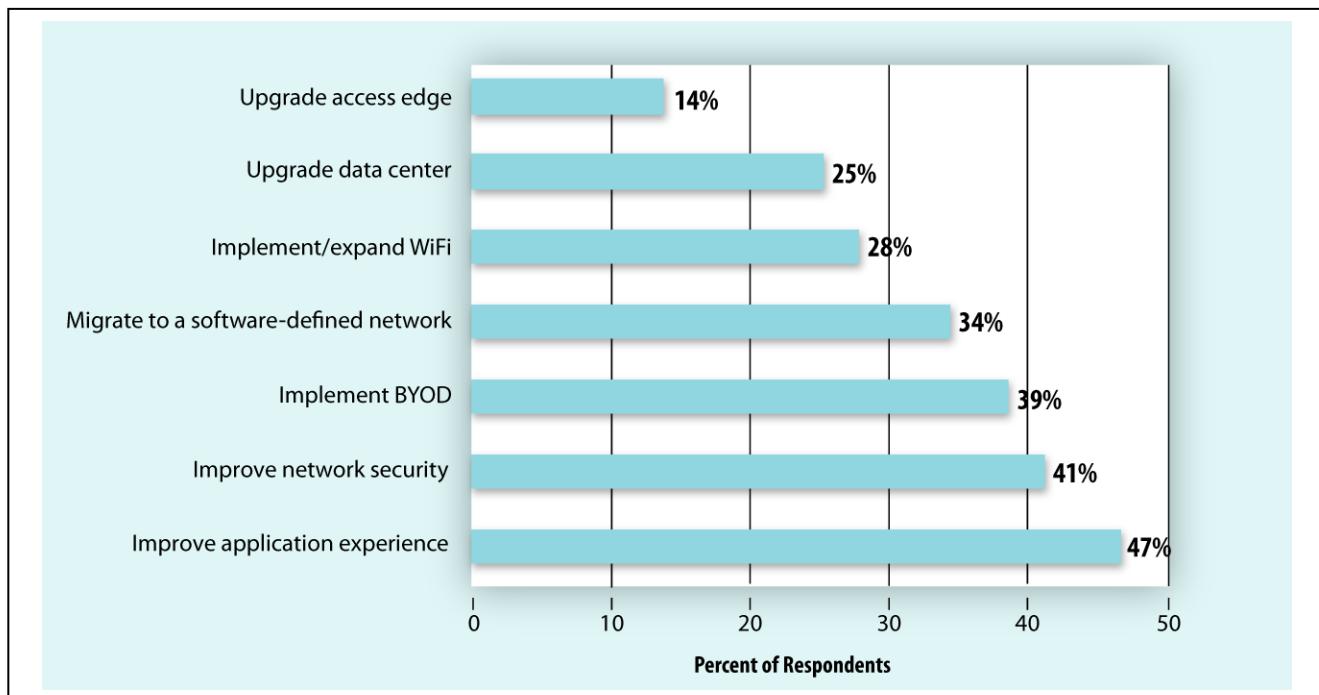
- **Capacity challenges:** Many new types of applications drive WAN traffic. In addition to cloud, mobile applications, voice-over-IP and video traffic are all contributing to the growth of branch bandwidth. For many companies, T1 speeds (1.5 Mbits per second) are the de facto standard, which is typically three to four orders of magnitude slower than LAN traffic. Upgrading from a T1 to multiple T1s to a T3 can be very expensive and involve long lead times. Ethernet access is more commonly considered today because it offers speeds that are similar to LAN speeds, but high-bandwidth services can be costly, particularly over long distances.
- **Inability to optimize application performance:** The ZK Research 2014 Network Manager Survey (Exhibit 3) revealed that the top priority for network managers is improving application performance because poor application performance leads directly to lost productivity. However, traditional WANs are designed to pass traffic without performing any kind of optimization

### Exhibit 2: Legacy WANs Pass Internet Traffic Inefficiently



Source: ZK Research, 2015

### Exhibit 3: Application Performance Is a Top Priority for Network Managers



Source: ZK Research 2014 Network Manager Survey

on the packets. Some network services, such as MPLS, can handle very basic application prioritization by placing high-value services in higher classes of service, but this typically comes at a high cost.

- **Inadequate security services:** Legacy WANs are typically secured by placing a large firewall at the Internet ingress/egress point, most commonly found at a central site. Although this may seem logical, it presumes all branch offices need the same level of security. However, the security requirements from branch to branch can vary significantly depending on the requirements for access to Internet services. A centralized firewall doesn't offer the level of flexibility required to secure a heterogeneous set of branches.
- **High total cost of ownership (TCO):** The cost of broadband Internet services has fallen precipitously over the past decade. In some cases, it's possible to purchase 100 Mbits per second for less than \$100 per month. However, few businesses have been able to take advantage of low-cost broadband Internet because legacy WANs are static in nature. Consequently, integrating broadband connections into the WAN is often difficult, if not impossible, for most organizations.

### Section III: Top Five Considerations for a Cloud-Ready WAN

Cloud- and SaaS-based applications have become the preferred method for most businesses to procure new applications. The cloud offers ubiquitous access and a pay-per-use model that makes it attractive to many business leaders. Because of this, line-of-business managers are now procuring SaaS-based applications without the knowledge of their IT departments. Despite this, IT leaders are still tasked with providing a rock-solid WAN that can secure and optimize cloud services. To accomplish this, a cloud-ready WAN must be implemented. Although all organizations should evaluate their WAN for cloud readiness, doing so is now imperative for highly distributed businesses with many branch locations.

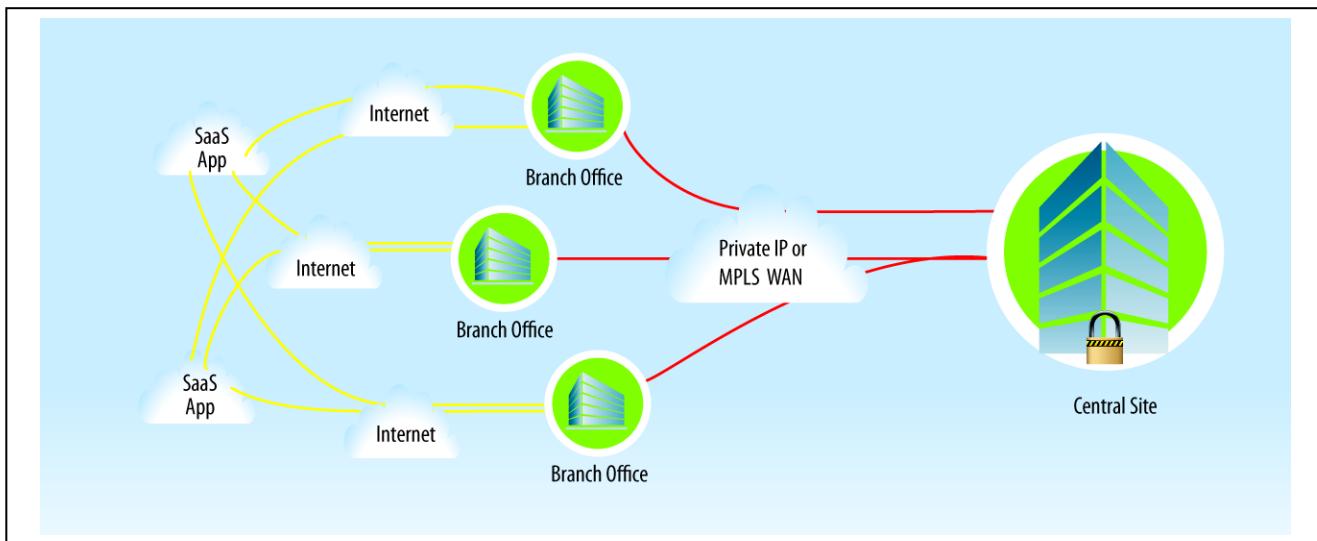
All organizations should consider the following five points when building a network to support cloud-based applications:

- **Split tunnels are a must.** The traditional hub-and-spoke type of network routes all Internet traffic through a centralized point. This single point of ingress/egress acts as a choke point for the network, can slow down traffic because it

must traverse the entire WAN, and can drive up network costs. A more efficient model would entail every branch location having its own Internet connection for accessing cloud applications and a connection to the private WAN to reach corporate resources (Exhibit 4).

- **Leverage broadband where available.** Broadband services have made significant improvements in price/performance and stability, and they should be utilized where available. There are two ways to leverage low-cost, high-speed broadband access today. In some cases, organizations can replace expensive private network services, such as MPLS, with a broadband Internet connection or a broadband VPN service. In most cases, broadband VPNs can deliver network performance that is on par with or better than MPLS services. Alternatively, a broadband network can be deployed as a backup to the MPLS service. Traditional WANs are built on an active-passive model, where the backup connection only becomes active when the primary connection fails. Today's technology enables an active-active configuration, where mission-critical traffic can be carried over the MPLS network, and all other traffic is carried over the broadband Internet connection. Whichever use case the business would like to implement, broadband services generally offer superior price/performance compared to MPLS services.
- **Security should be integrated into the branch infrastructure.** Businesses should move away from a centralized security model where every distributed location is secured from a single security appliance in a central location. Unified threat management appliances (UTMs) are low-cost branch devices that offer a wide variety of security services, such as firewalls, VPN termination and intrusion prevention, to ensure the business can customize its security based on the branch's requirements. It's important to note that UTMs have all of the security features available in silicon ASICs, so there is no loss of performance.
- **WAN optimization is an imperative.** With older versions of WAN optimization appliances, it wasn't possible to optimize the performance of Internet traffic. Also, standalone appliances made deployment and management of large-scale environments very difficult. Today, advanced WAN optimization that is capable of optimizing Internet traffic comes as an embedded service in many routers and UTMs, resulting in a single branch appliance making management much

### Exhibit 4: Split Tunnels Make Access to the Cloud More Efficient



Source: ZK Research, 2015

simpler. Businesses should ensure that end-to-end quality-of-service and acceleration are used to enable the best possible experience over private and Internet connections.

- **Invest in network visibility tools.** Legacy management tools offered no granularity when it came to network traffic, particularly Internet traffic. This can be problematic for SaaS-based applications because all cloud traffic will look like Internet traffic. It's critical to invest in visibility tools that can see individual traffic flows. The tool should collect the data and then analyze it to understand how traffic patterns change over time. Network analytics can be used to accurately predict the bandwidth needs for the business in two to three years, enabling IT to be more proactive with network upgrades rather than having to react to poor application performance.

### Section IV: Conclusion and Recommendations

A next-generation, cloud-ready WAN is a critical component of every business's cloud strategy. By redesigning the WAN to take advantage of lower-cost broadband connectivity deployed in a hybrid architecture where branch offices can read the Internet directly, organizations can lower network costs, improve security and optimize the performance of cloud-based applications. Business and IT leaders need to think of the network as a strategic asset and an enabler of the cloud, and not just a commodity resource. To successfully

capitalize on the cloud computing era, ZK Research recommends the following:

- **Embrace SaaS-based applications as the best delivery model for this era of work.** Business and IT leaders should leverage the power of the cloud to maximize the productivity of a distributed workforce. Cloud is a better strategy than premises-based applications because the cloud provides a simpler way of delivering applications to any worker, anywhere, on any device.
- **Leverage the network for computing success.** IT leaders need to shed the legacy thought process regarding the network and its lack of relevance to the rest of IT. Cloud is a network-centric compute model, and it can be used to secure and optimize SaaS-based applications.
- **Use a network service provider that is aligned with the cloud computing era.** The evolution to a cloud-ready network should include the willingness to move away from your incumbent network service provider, if necessary. Many traditional telecom providers have legacy networks that cannot take advantage of advancements in broadband services. It's important to build the company's next-generation application strategy on a next-generation network, not a legacy network built for an era of computing that is rapidly fading away.