Overcoming the Challenges of WAN Application Delivery
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Today's small-to-medium size enterprises (SME) rely heavily on their business applications being sent reliably over the Internet, outside of their LAN. These applications can include inventory, customer relationship management, sales, accounting and other critical applications that are the livelihood of a company’s operations. Therefore, quick and reliable delivery of these applications to users is a major challenge for today’s IT departments. To achieve greater productivity, local employees, telecommuters, business partners and customers must all have unhindered access to critical applications. Any delay in delivering these applications, or deficiency in the availability and security of the applications, can cause user productivity to suffer and adversely affect business profitability.

Difficulties abound

When it comes to delivering applications over the WAN, there are many obstacles to overcome. Lack of sufficient bandwidth and latency issues result in low throughput and long delays. Slow or difficult to use remote access applications can also attribute to lost productivity, while insufficient security can put private data and the applications themselves at risk.

Obstacles to efficient application delivery over the WAN

- Relying on a single ISP for network connectivity is dangerous
- Getting enough bandwidth to support business-critical applications can be expensive
- Getting enough bandwidth to support mission-critical applications can be hard to manage
- Lack of planning for complete application performance over the WAN

Solving the WAN application delivery challenge: why traditional products fall short

As is the case with many organizations, IT personnel find themselves bogged down in addressing poorly performing WAN networks. Rather than solving the problem with the most cost-effective and efficient solution, they often resort to adding more bandwidth, which really doesn’t solve the problem. After applications have been deployed over the WAN, the expectation is that the months of planning and trials would deliver a successful rollout. Unfortunately, problems come about when the application is rolled out to the whole user population. Today, there are many solutions available that affordably address problems associated with delivery of critical applications over the WAN.

While many applications may be customized in order to take advantage of the business processes and optimize user productivity, when the applications are deployed over the WAN, the application performance often degrades, causing user productivity to suffer, adversely effecting the bottom-line. Unfortunately, many performance issues are identified as network problems, even if the network infrastructure is performing well for other applications. Some of the areas that can adversely affect applications over the WAN include:

- Poor WAN link performance
- ISP link failure
- Congestion from too much traffic going over the WAN link

Intelligent inbound and outbound load balancing and failover: more than just a dual WAN router

A dual WAN router uses simple policies to “route outbound-only traffic” over one of two lines. There is no intelligence in the technique and no method to avoid or minimize congestion. In fact, the rigid nature of the technique frequently adds to congestion problems and does nothing in terms of WAN and ISP link load balancing. Dual WAN routers are incapable of failover for inbound traffic, leaving inbound services susceptible to outages. This can cause lost revenue associated with downed e-commerce sites, or lost productivity from remote offices with users losing access across VPNs.
A more cost-efficient and flexible solution is using WAN Optimization Services that provide ISP multi-homing and intelligent load balancing and failover. These services utilize micro-appliances that are located between firewalls and WAN gateway devices, and use a simplified and more up-to-date architecture often based on Network Address Translation (NAT) and Domain Names Service (DNS).

The advantages of an integrated WAN Optimization Service for intelligent load balancing and failover
One of the most cost-effective and flexible solutions for addressing WAN application delivery challenges are WAN Optimization Services that bring together cost-saving bandwidth, flexible link aggregation, network security and automatic WAN link and site failover required for small-to-medium size enterprises that deploy critical applications over WAN networks. Today's advanced WAN Optimization Services bring together the capabilities required for ensuring network availability for applications. These products should include three key capabilities:

1. Inbound and Outbound Load Balancing — Ensures that bandwidth is always available to all applications and users
2. Inbound and Outbound Failover — Ensures network reliability and site uptime
3. Security — Ensures applications are protected from network attacks

Ecessa's WAN Optimization Services
Ecessa's optimization services improve network performance, while delivering high-availability and reliable connectivity for multiple and diverse ISP and WAN links. It is the ideal solution for any SME seeking to cost-effectively improve performance and uptime for applications going over the WAN. Ecessa integrates multiple technologies to deliver highly efficient link aggregation, load balancing and failover for greater reliability and improved performance, while reducing ongoing operational expenses through the consolidation of multiple WAN optimization capabilities within a single micro-appliance. This is an affordable solution for reducing the number of WAN traffic management devices, and takes advantage of cost-efficient bandwidth to meet application delivery needs.

Ecessa services deliver...
- Faster and less expensive deployment and administration of multiple ISP and WAN links, automatically directing traffic to the more cost-efficient and best performing WAN links
- Reduction of expensive WAN links, dramatic performance gains through efficient management of WAN link availability, and reduced WAN deployment costs
- Higher productivity for users, featuring automatic WAN and ISP link load balancing and failover, multiple site failover, and traffic shaping and application prioritization to speed the delivery of critical applications

ISP and WAN Link Aggregation — Provides the flexibility needed to cost-effectively bring multiple links together
Outbound Load Balancing - the WAN Optimization Services provides outbound bandwidth load balancing and failover. The user defines weights (bandwidth capacity) based on the bandwidth of each WAN link. When a session or call is generated from the LAN, the appliance computes which link has the most available bandwidth and routes traffic from that session or call over that particular WAN link. The device typically allows the selection of two link load balancing algorithms:
- Symmetrical round robin - routes sessions to all links in a round robin manner.
- Intelligent (weighted) load balancing - computes a ratio between the weight (bandwidth capacity) of the different WAN links, and then routes sessions and calls accordingly. That is, the faster the link, the more sessions or calls that will be sent over that link, in order to make the most efficient use of all the bandwidth available. Additionally, an intelligent link load balancing solution will examine the amount of real-time traffic on each link, compared to the amount of available bandwidth resources left, and choose the best path for the next session or call's most optimal route for performance.
Inbound Load Balancing - is accomplished by the micro-appliance acting as the authoritative DNS server for the domain. The appliance advertises all available WAN links to the DNS caching servers which in turn resolve the domain names to queries in a round robin format. In this manner, all externally initiated sessions are load balanced over all available links. Since the appliance is resident at the domain site and is able to directly monitor the link status, failed links are removed from the DNS tables immediately upon failure. By setting the host name record Time-to-Live (TTL) to a short period (i.e. 30 seconds), the DNS caching servers will flush their address tables and will update them from the appliance regularly, and thus be informed when a link fails.

Border Gateway Protocol (BGP) has long been used for multi-homing, but the cost and complexity of BGP makes it impractical for most small and midsized businesses. Ecessa uses NAT and authoritative DNS to overcome these restrictions, providing more manageable and less expensive outbound and inbound link load balancing and failover.

Ecessa’s WAN Optimization Services support optional device failover through their active/passive failover capability. This eliminates the chance of the micro-appliance being the single-point-of-failure.

ISP and WAN Link Load Balancing — Ensures that bandwidth is always available to all applications and users

High Availability - Since all outbound and inbound traffic must pass through the micro-appliance, should it fail, the entire site will be inaccessible. To address this, some vendors support redundant configurations. Usually, a standby (or redundant) configuration is supported - sometimes referred to as HA (High-Availability). Most sites utilize at least one HA pair - as it would be risky to deploy multiple WAN links for redundancy and scalability, only to lose the entire site due to the micro-appliance hardware failure. Should one of the micro-appliances go down, the monitoring service will notify the administrator.

Performance - Performance of applications over the WAN directly affects response time. This includes not only total average transaction time, but assures that users located at performance-challenged sites (such as branch offices) still receive the acceptable level of performance. Performance is an important criterion for any piece of networking equipment, but it is critical WAN Optimization Services, because datacenters are central points of aggregation. As such, the micro-appliance should support extremely high volumes of traffic transmitted to and from sites. A simple definition of performance is how many bits-per-second the device can support. While this is extremely important, in the case of a micro-appliance, other key measures of performance include how many WAN links, how fast the failover occurs from one link to another, number of supported concurrent sessions, number of domain names, and number of hostnames within each domain

Traffic Shaping and Application Prioritization - Traffic shaping includes the ability to prioritize network traffic to ensure that adequate bandwidth is always available to specific bandwidth-intensive applications, especially during periods of congestion. Rules determine bandwidth minimums and maximums for specific types of traffic and use load balancing and automatic failover to direct this traffic to links with sufficient bandwidth. WAN Optimization Services should provide traffic shaping and application prioritization support for traffic based on defined rules.

ISP and WAN Link Failover — Ensures network reliability and site uptime

Disaster Recovery/Site Failover - Many businesses need to redirect Internet traffic to a disaster recovery site should a catastrophe disrupt a main site. WAN Optimization Services have, in effect, reduced the cost to ensure that site failover and fallback occur automatically, and reliably, making this functionality practical and affordable even for the smallest businesses.

WAN Virtualization - WAN Optimization Services can support WAN Virtualization to bond multiple network links into a single high-bandwidth channel to ensure high-availability for applications. If one link goes down or degrades in performance, traffic is automatically directed to the best working links without interruption. WAN Virtualization is a form of load balancing which allows for stateful failover of traffic to the best performing links to ensure critical applications avoid problems that occur when they are stopped on one link and restarted over another link. WAN Virtualization ensures that critical applications avoid failures, and are never adversely affected, even after brief disruptions.

Security - More advanced WAN Optimization Services include built-in firewalling and security features to provide
added security and lower the cost of support, maintenance and overall infrastructure complexity through device consolidation.

WAN Optimization Services compared to a dual WAN router

As mentioned earlier, dual WAN routers use simple policies to “route outbound-only traffic” over one of two lines. They offer no intelligent load balancing and failover capabilities, and no method to avoid or minimize congestion. In fact, the rigid nature of the technique frequently adds to congestion problems. Dual WAN routers do not provide WAN and ISP link load balancing and failover for inbound traffic.

WAN Optimization Services incorporate hardened appliances that are located between firewalls and WAN gateway devices, and use a simplified and more up-to-date architecture based on Network Address Translation (NAT) and Domain Names Service (DNS). Ecessa services are designed for small and medium enterprises who can’t afford the expense and overhead of multiple Cisco (or other) routers, and the heavy demands placed on them by ISPs for using BGP.

Summary

It is essential that critical applications and network infrastructure be considered together as application infrastructure for supporting strategic business objectives. Ecessa’s services are affordable solutions designed to ensure the optimum performance, reliable delivery and protection of applications. The unique features of Ecessa’s WAN Optimization Services are designed to optimize network bandwidth and the delivery of critical applications, secure network, data and application assets, and ensure business continuity.