XRoads Networks

XROADS NETWORKS – WHITE PAPER

# Site2Site VPN Optimization Solutions

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The purpose of this paper is to provide an understanding of how XRoads Networks' applied patent Site2Site tunnels solve real-world challenges faced by today's network administrators trying to manage remote office connectivity.
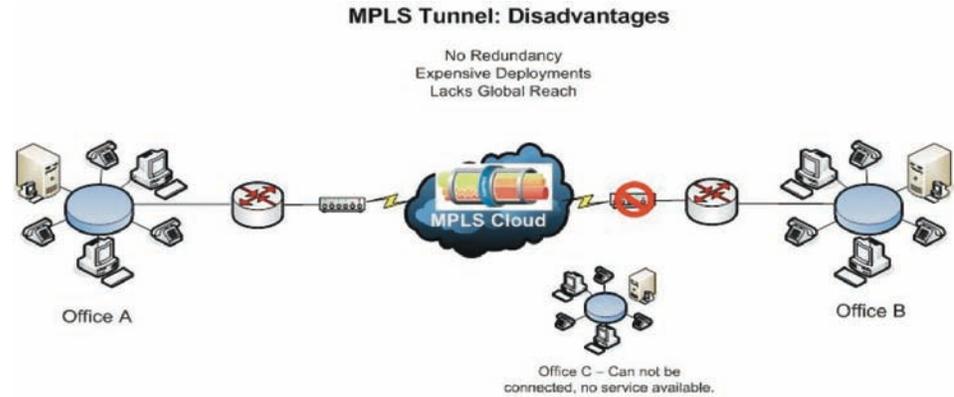
Background

As organizations deploy remote networks they must find a method for connecting those remote networks to centralized resources, i.e. CRM systems, accounting systems, order entry systems, etc. In the past, the primary method used for connecting these remote networks was through either a Virtual Private Networks (i.e. an encrypted connection over the Internet), or a private lease line service (i.e. point-to-point T1, frame relay, and now multi-protocol labeled switching or MPLS).

Virtual Private Networks or VPN's provide a secure and inexpensive method for connecting remote offices to central data centers, however most VPN configurations lack redundancy in the event of a network failure, and all standard VPN solutions require the wholesale upgrade of network connections when additional throughput is needed.
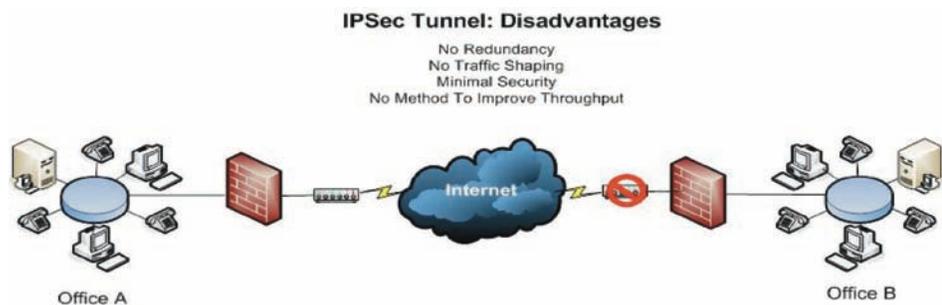
Multi-Protocol Label Switching or MPLS is the newest method for setting up private connectivity for remote sites. The cost for these connections are higher, however MPLS typically includes additional traffic shaping capabilities and can generally be easily upgraded for additional bandwidth. Expense is a major issue with MPLS as is the fact that MPLS is not globally available and thus can not be rolled out worldwide. Additional even with the additional security and traffic shaping, MPLS lacks any simple form of redundancy in the event of a network failure.

MPLS Tunnel: Disadvantages
No Redundancy
Expensive Deployments
Lacks Global Reach

Office A

MPLS Cloud

Office B

Office C – Can not be
connected, no service available.

Problem

How does one incorporate a **universal solution**, with built-in **automated redundancy**, that is **inexpensive to deploy**, and provides added **security above and beyond standard IPSec** deployments?
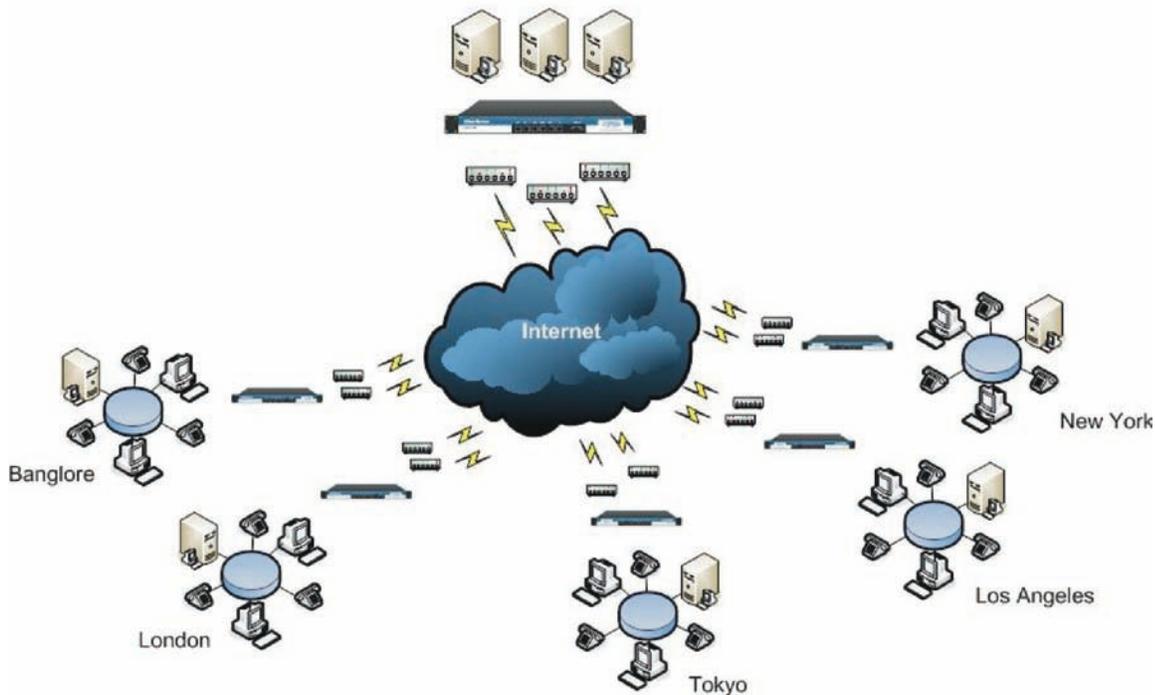
Solution

XRoads Networks' Site2Site VPN connectivity technology provides the solution. Our Site2Site VPN tunnels are inexpensive to deploy, include built-in redundancy capabilities which can failover automatically in the event of a network outage, can be deployed around the world using any type of broadband connection, provide end-to-end QoS and traffic shaping, and provide up to five times the security of standard IPSec deployments.

Site2Site Delivers:

1. A single global deployment vehicle.
2. A fully meshed and fully redundant remote office connectivity solution.
3. A highly secure solution, similar to MPLS and private lease line solutions.
4. A scalable solution with built-in end-to-end QoS and traffic shaping.
5. A solution that can provide improved performance through BPR tunnel routing.

Our Site2Site solutions provide a global reach that can not be achieve by any other solution which incorporates same the level of QoS, redundancy, and scalability.

MVLS Global Network

Site-to-Site Fully Meshed Redundancy: With our Site2Site tunnels a network administrator can configure a completely redundant and fully meshed remote office solution. Full meshing means that even in the event that two simultaneous network outages occur at both ends of the tunnels, that the remote sites stay up and running.

Mesh VPN Link Sharing: Advantages
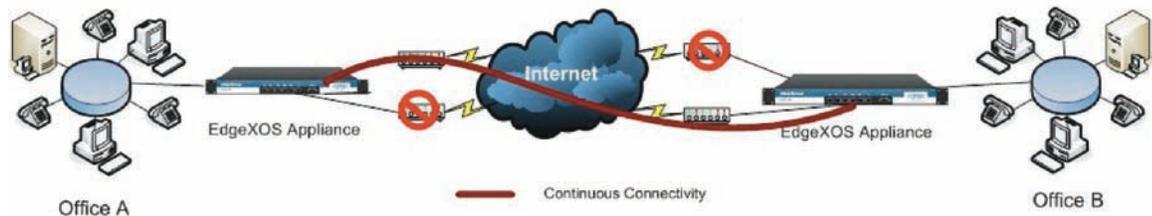
Site-to-Site Security: Because our Site2Site tunnels utilize multiple WAN links for passing traffic, link balancing improves security as no single link can be sniffed in order to obtain multi-session information. The balancing of session traffic by nature improves security across the tunnels.

Mesh VPN Link Sharing: Advantages

Improved security through session balancing. Minimizes the ability to sniff multi-session traffic and thus brake current encryption sets.
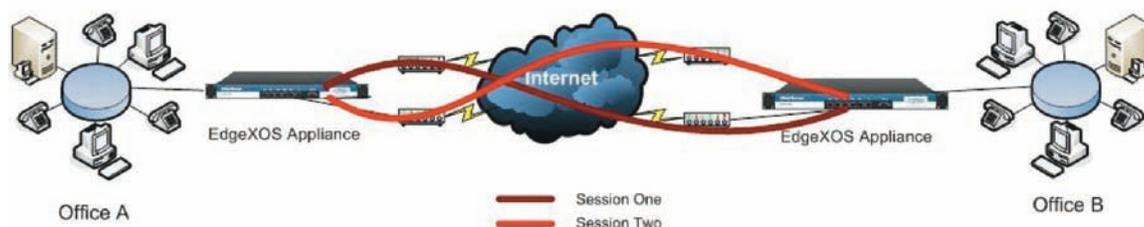
Site-to-Site Best Path Routing: Built-in to the routing mechanism for our Site2Site tunnels is our Best Path Routing technology. Best Path Routing uses network thresholds to determine which tunnel path is the best one to use for sending each new session. This ability ensure that even when a link begin to perform badly that the Site2Site tunnels are always leveraging the best possible connectivity provided via the available WAN links.


Mesh VPN Link Sharing: Advantages

Best Path Routing Thresholds: Enable dynamic path selection, which automatically determines the best path to route the tunnel traffic.
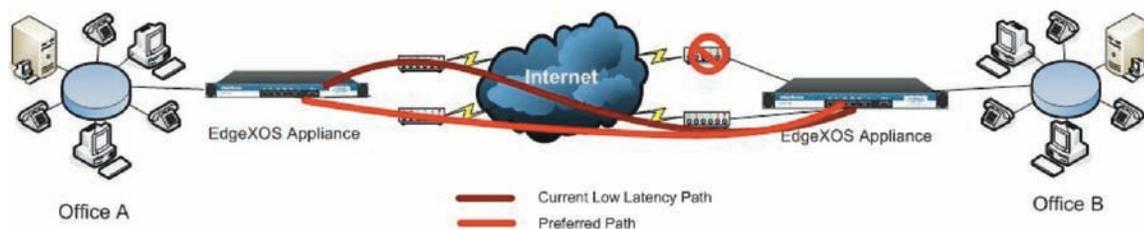
Site-to-Site QoS: As packets traverse the Site2Site tunnels, packet labeling is performed (as in MPLS networks) with the label state remaining constant from end-to-end. This ToS/Diffserv labeling can be used to classify packets based on application type in order to prioritize critical applications. In addition, the EdgeXOS platform incorporate full rate-shaping and bandwidth partitioning at each end of the tunnel thus guaranteeing critical application priority between sites.

Mesh VPN Link Sharing: Advantages

End-to-End QoS is delivered through stateful Tos/Differv settings and shaping policies which can be applied at both ends of the tunnel.
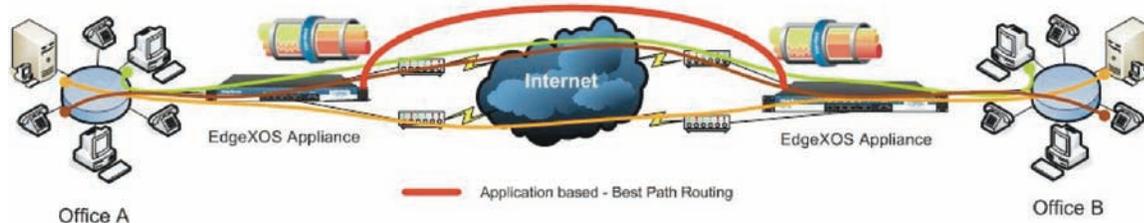
Site2Site vs. Packet Splitting: The EdgeXOS platform utilizes a technology called session balancing instead of packet splitting as we feel that session balancing, when combined with Best Path Routing, is a superior method for improving site-to-site communications across two or more broadband connections.

Problems w/Packet Splitting: Packet splitting has a number of issues specifically when used on lower quality links (i.e. broadband links which are being bonded together for higher throughput). The problem is due to the nature of network connectivity and how the TCP/IP protocols work.

Packet splitting (also known as tunnel aggregation) increases speeds for single sessions by splitting the session's packets across two or more WAN links.   While this method can dramatically improve network throughput, it does not always improve network responsiveness.

For example, if packets are being split across two or more links and one of the links begins to perform badly, i.e. the link begins dropping packets or the latency gets so high that the remote tunnel device is unable to adequately re-assemble the packets in a timely basis, then the overall responsiveness actually drops and thus the benefits of the increased bandwidth are lost.

Under either of these conditions the overall performance of the site-to-site connection is actually reduced, even though the throughput may be increased. The net results are very slow response times for real-time applications, and slower than expected download speeds for large file transfers.

At XRoads Networks' we realize that there are times that packet splitting can be used effectively to improve site-to-site performance for large file transfers. However for most network usage, i.e. VoIP, CRM, web applications, database access, and other short-term real-time applications, our session balancing option with Best Path Routing is the best possible approach. When combined with our fully meshed redundancy, built-in end-to-end QoS, and traffic shaping there simply is no better option for remote office connectivity.

Summary

The EdgeXOS platform delivers a unique and complete remote office connectivity solution that ensures that the overall experience for remote end-users is positive and without interruption. Our MVLS technology provides a **more reliable**, **more responsive**, and **more cost effective** remote office connectivity solution then any other available on the market today.