How Mature are Clientless SSL VPN?

Tim Likarish, Eric Anholt, Biljana Risteska,
Valentina Grigoreanu, Jens Mache, Chris Stevens
Lewis & Clark College
Portland, OR 97219, USA
{likarish, jmache}@lclark.edu

A Virtual Private Network (VPN) offers a secure connection over an insecure network such as the Internet. Driven by an ever expanding mobile workforce and by the need for a cheaper alternative to private leased lines, the security community responded with a variety of VPN solutions deployed in a diverse array of software and hardware. Traditional VPNs offer good net-to-net (site-to-site) connections but often require intense configuration and may have problems with NAT. In order to provide mobile users with an alternative to the configuration-intensive traditional VPN, clientless web browser based SSL VPNs were developed. The clientless SSL VPNs allow users to connect securely with only a web browser, however, at what cost?

In our preliminary black box testing, we measured the performance of the Cisco 3000 series Concentrator release 4.0 VPN, which includes a browser based VPN. We ran the tests in Internet Explorer on a computer running Windows XP. We tested the throughput by transferring a 10MB file with a web browser over a fast Ethernet connection. Without VPN, throughput was 6500 KBytes/sec. With clientless SSL VPN, throughput was reduced to an average of 568 KBytes/sec. It took an average of 18 seconds to download. Next we tested the throughput while using the Java applet which can redirect connections for protocols besides HTTP. With the Java applet, performance was further reduced to an average throughput of 286 KBytes/sec and an average download time of 35 seconds. Then we tried simultaneously downloading the file from two different computers multiple times without much luck. The two times the transfer was successful it completed with average throughput of 141 KBytes/sec and took an average of 71 seconds. However, there were multiple occurrences of the VPN becoming unresponsive.

These preliminary results demonstrate that when using Cisco's SSL VPN a user experiences significant performance drops and detrimental scalability issues. In comparison, we tested FreeS/WAN, a traditional IPSec-based VPN, in a similar set up and the wget throughput was only reduced to 10.87 MBytes/sec from 11.22 MBytes/sec without the VPN, which is 97%. In contrast, the clientless SSL VPN ran at roughly 8% of the non-VPN throughput, and the clientless SSL VPN with the Java applet ran at about 4%.