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Multilayer Switches: A Quick Overview

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In my opinion, the most important feature of a multilayer switch (MLS) is the ability to route and manage VLAN traffic. When dealing with large networks, where numerous users across several security zones all interact with one another, differentiating security rights and privileges would be a nightmare to manage. However, using the functionality of a MLS, a network admin can create VLANs to virtually split traffic so that security is inherent in the system. Automatic redundant security is never a bad thing.

The ability of MLSs to use Differentiated Service Code Point (DSCP) headers to prioritize and route traffic cannot be overlooked (Microsoft Corporation, 2005). Assigning weighting metrics to packets and ensuring those packets do not overwhelm other traffic is a must for any highly used network interface. Essentially, QoS is managed at the switch level, rather than being sent to a server, or ISP, to have the packets analyzed and prioritized. User traffic remains constant without fear of someone’s download affecting the performance of the network.

Managing MLSs can be done through several different methods, each having its pros and cons. However, personally I prefer the web interface method. Nothing gets across what is occurring better than a good old-fashioned picture. That being said, the console cannot be relegated to the bin. There are naturally some functions which can only be done through the command line. In those instances, MLSs can be managed directly via a serial cable, through SSH, or telnet, although, telnet should never be used, and in most cases has been depreciated entirely.

MLSs allow the network admin to troubleshoot a network before having to go out and do any physical work. By viewing routing tables and whether links are still active, network breaks can be determined, sometimes to within a few feet. Routing faults within DNS entries can also be confirmed through these same routing tables. For instance, if an A record is pointing to an incorrect IP address, this would be obvious when traffic begins to pour into a location that rarely receives movement.

With that, switch performance should never be an issue if proper network planning is implemented. However, in the event that a network expands faster than implementation can handle, there are areas which can be cut back. If NAT, SSL encryption, and QoS are operating at the switch level, these can all be moved off device, thereby freeing up processor time for layer 2/3 packet switch routing. Nevertheless, these functions are usually done through application-specific integrated circuits (ASIC), and as such, moving functions off the switch may not improve performance at all (SiliconFarEast.com, 2005).

MLS’s are a combination of Switching and Routing along with server level features such as NAT, SSL encryption, and QoS. The fact that multiple passes and device interactions is minimized, means that while these functions can be done by other devices, for efficiency sake and security, they should remain on the MLS. Yes a function can be done externally to a MLS, but the performance increase is minimal, and in most cases is detrimental to the purpose of networking.

The opportunities an MLS offers greatly outweigh the use of multiple devices. Intrinsically, the security of an all-in-one device, combined with VLAN routing, are worth more than an ultra-firewalled server dedicated to any single use. Also, in the case of any issues on a network, having the MLS as a guide will help to pinpoint issues wherever they may arise. The MLS is an efficient work reducing tool when used and configured correctly.

References

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