

## LAN Faults Can Cause WAN Saturation

If you just left your house and forgot something, it's easy to return home to pick it up and restart your journey. If you left your house and crossed a traffic-congested bridge, it's a bit more difficult and costly to return home, pick up the item, and get back across that bridge. In addition, you are adding to the traffic congestion problem on the bridge because you traversed it twice.

Networks have a similar problem: If packets are dropped in a local LAN, it's inexpensive to retransmit them because LANs typically have a lot of available unused bandwidth. However, if the packet traverses the local LAN *and* the WAN circuit before it gets dropped in the remote LAN, then the bandwidth-constrained WAN link is used twice to transfer the same data. Even worse: if there is a chance that the retransmitted packet gets dropped in the remote LAN again, the resource is further constrained.

How much WAN saturation can occur as a result of this type of problem? If a WAN link is 75% loaded, and a downstream LAN link has 20% loss, it means that 20% of the 75% needs to be retransmitted, adding an additional 15% load to the WAN link. Monitoring systems might show the WAN link as having 90% utilization as a result.

This problem can be difficult to resolve because a number of tools don't recognize it:

- Netflow won't show anything unusual because it can't see loss or retransmits.
- A Wireshark capture would show the retransmits, but not be able to indicate where or why the retransmits were happening.
- Monitoring software solutions don't collect enough error counter information to know that packets are being dropped.

**Note:** *The packets don't have to be lost on the downstream link, they may be dropped anywhere downstream of the constrained resource and this problem will occur.*

How do you identify and resolve this problem?

You would need to know the error counters and performance information on all links, switches, and routers in the network, and have a correlation engine and automated analysis in order to put the pieces together. That way, you would immediately realize when packets in the LAN (or WAN for that matter) were being dropped, and have an understanding of where and why the problem was happening.

