

Techniques for Monitoring WAN Links

Most business organizations use WAN links to interconnect local area networks (LANs) at geographically dispersed sites. Over the years, as business organizations continue to grow both nationally and globally, the demand for WAN links has steadily increased. Call centers, for example, have moved off-shore; distributed computing has replaced large regional data centers; sales offices have expanded to new locations. As WAN links become integral to the day-to-day operations of the business organizations, the availability and reliability of WAN links has a direct, highly visible impact on business operations, employee productivity, and customer satisfaction.

The cost of WAN Links versus Business Impact

Monitoring WAN links for availability and reliability is essential: business organizations absolutely require continuous uptime, fast response times, and minimal transmission errors. But the cost of WAN links is also a factor. A T1 line, which is the most common type of WAN link, provides 1.5 megabits-per-second (Mbps) of bandwidth at an average cost of \$600 a month. A T3 line, which offers 45 Mbps of bandwidth, can cost \$15,000 a month. Monitoring WAN link utilization can help ensure the business organization is receiving optimal network performance without over investing in network infrastructure.

Due to the cost of leasing a WAN link, it's often difficult to justify an additional T1 or T3 line unless an existing link is consistently running at 80% utilization or higher. In theory, the link can run at 100% utilization, which may sound a bit like "getting the most bang for the buck," but utilization rates fluctuate constantly depending on changes in network traffic. For example, utilization may be high in the morning when people come to work and read their email or later in the afternoon when customers scramble to submit their orders before going home for the day. And sometimes the network simply gets hit with a lot of traffic.

The point is, when monitoring link utilization, it's important to allow for "spikes" in network traffic. Otherwise, if a link is running at 95% utilization, and network traffic spikes, the interface on the WAN router may become overwhelmed and start to drop packets or experience other sub-optimal behavior. Business application users and customers, in turn, will notice significantly reduced response times and throughput. So it's crucial to monitor WAN links not only for availability and reliability, but for utilization as well to determine a nominal utilization rate that can withstand spikes without impacting the business organization. Also, should high utilization rates begin to impact business efficiency, collecting historical data on utilization rates can underscore a business justification for an adding a new WAN link.

Key Metrics for Monitoring WAN Links

When monitoring WAN links, the three key metrics to consider are availability, utilization, and latency.

Availability is the "up" or "down" status of a router interface over time (also referred to as "uptime"). High availability (99-100%) indicates the WAN link is fully available to business users. Low availability (less than 95%) may indicate a persistent problem with the router or WAN link.

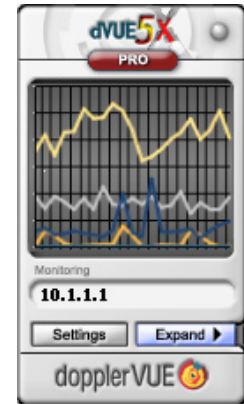
Utilization is the percent of data throughput relative to the maximum capacity of the router interface. Ideally, interface utilization should not exceed 70% or 80%. If utilization is consistently running above 90%, business users may experience reduced performance. Low utilization, on the other hand, indicates the interface is operating well below capacity.

Latency is the time it takes in milliseconds for a data packet to travel across the WAN link. High latency means data travels more slowly across the network, which can affect business users. Typically, high latency is caused by network congestion over the WAN link.

Tools for Monitoring WAN Links

There are a number of simple, easy-to-use tools for monitoring WAN links. As most network managers know, the ping command on a Windows or UNIX computer measures the “round trip” latency across a WAN link by “pinging” a device or computer at the far end of the link. For example, pinging a computer on the East coast from a computer on the West coast shows the round trip latency for the link, point-to-point, averages 117 milliseconds. For more detail, the trace route command lists the physical routers that form the WAN link and the number of milliseconds required for each “hop” between routers.

Because most network devices are SNMP-enabled, an SNMP monitoring tool can be used to measure the availability and utilization of the router interfaces that host the WAN link. For instance, SNMP OID Tracker, a free desktop SNMP tool, can graphically monitor any SNMP MIB-2 object. Monitoring the ifOperStatus (operational status) object shows the availability or up/down status of the interface, and the ifInOctets (octets in) and ifOutOctets (octets out) objects can be used in conjunction with the ifSpeed (interface speed) object to calculate interface utilization.

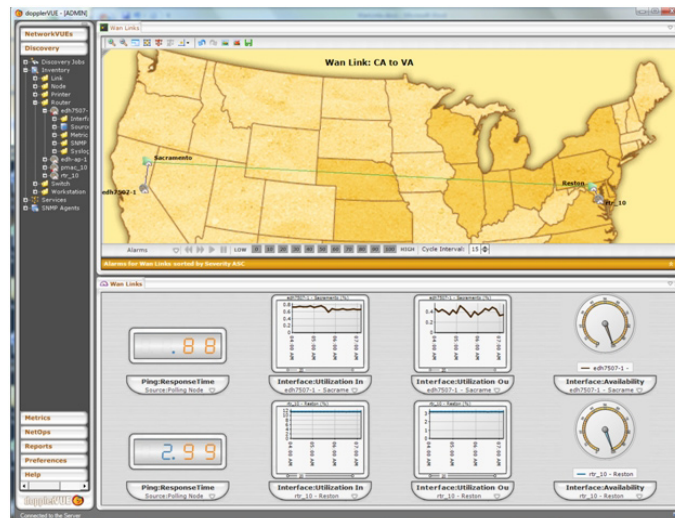


Monitoring WAN Links with dopplerVUE

Using basic, low-cost “point” tools has its advantages, but an integrated network management solution such as dopplerVUE provides a single, robust approach to managing networks. With dopplerVUE, you can easily monitor the availability, utilization, and latency (ping response time) of the WAN link from a single view. Moreover, you can set latency, utilization, and availability thresholds that automatically trigger alarms, email notifications, and other alerts whenever the respective metric exceeds the threshold value, allowing you to take immediate action before business users are affected. To monitor WAN links with dopplervue:

Make sure the devices on both ends are SNMP enabled, then run a discovery job using the correct community strings to discover the devices. Availability, utilization and latency metrics will be automatically collected.

1. Click **NetworkVUEs** in the navigation pane and right-click **dVUEs**.
2. Point to **Create dVUE** and select a **scope** (user, group or public) to designate who has access to this dVUE.
3. Name the dVUE (for example, WAN Links), then double-click the new dVUE to open it in the workspace.
4. Right-click in the workspace and point to **Add dVUE Item**.
5. Select a digital gauge, two line charts, and a circular gauge for each site (for example, Sacramento and Reston in screen shot).
6. Click **Metrics** in the navigation pane and expand **Metric Groups**.
7. Expand the **Ping** metrics group and drag **Response Time** to the first digital gauge. In the drop down list below the gauge, select the router for the “Sacramento” site. Repeat this step for the “Reston” site using the second digital gauge.
8. Expand the **Interface** metrics group and drag **Utilization In** to the first line chart, then drag **Utilization Out** to the second line chart. Using the drop-down list, select the router interface for the “Sacramento” site. Repeat this step for the “Reston” site using the remaining line charts.
9. In the **Interface** metrics group, drag **Availability** to the first circular gauge. Using the drop-down list, select the router interface for the “Sacramento” site. Repeat this step for the “Reston” site using the second digital gauge.



In today's world, the availability and reliability of your organization's WAN links have a direct impact on productivity, customer satisfaction, and profitability. By deploying an integrated network management solution such as dopplerVUE, you can proactively monitor all aspects of your network and deliver the performance your business organization depends on.

About dopplerVUE

dopplerVUE is a powerful yet easy to use network management solution for managing up to 5000 network elements. To see how dopplerVUE can solve your network management needs, visit to www.dopplerVUE.com. For more information call 888-dvue-now (888-388-3669).

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