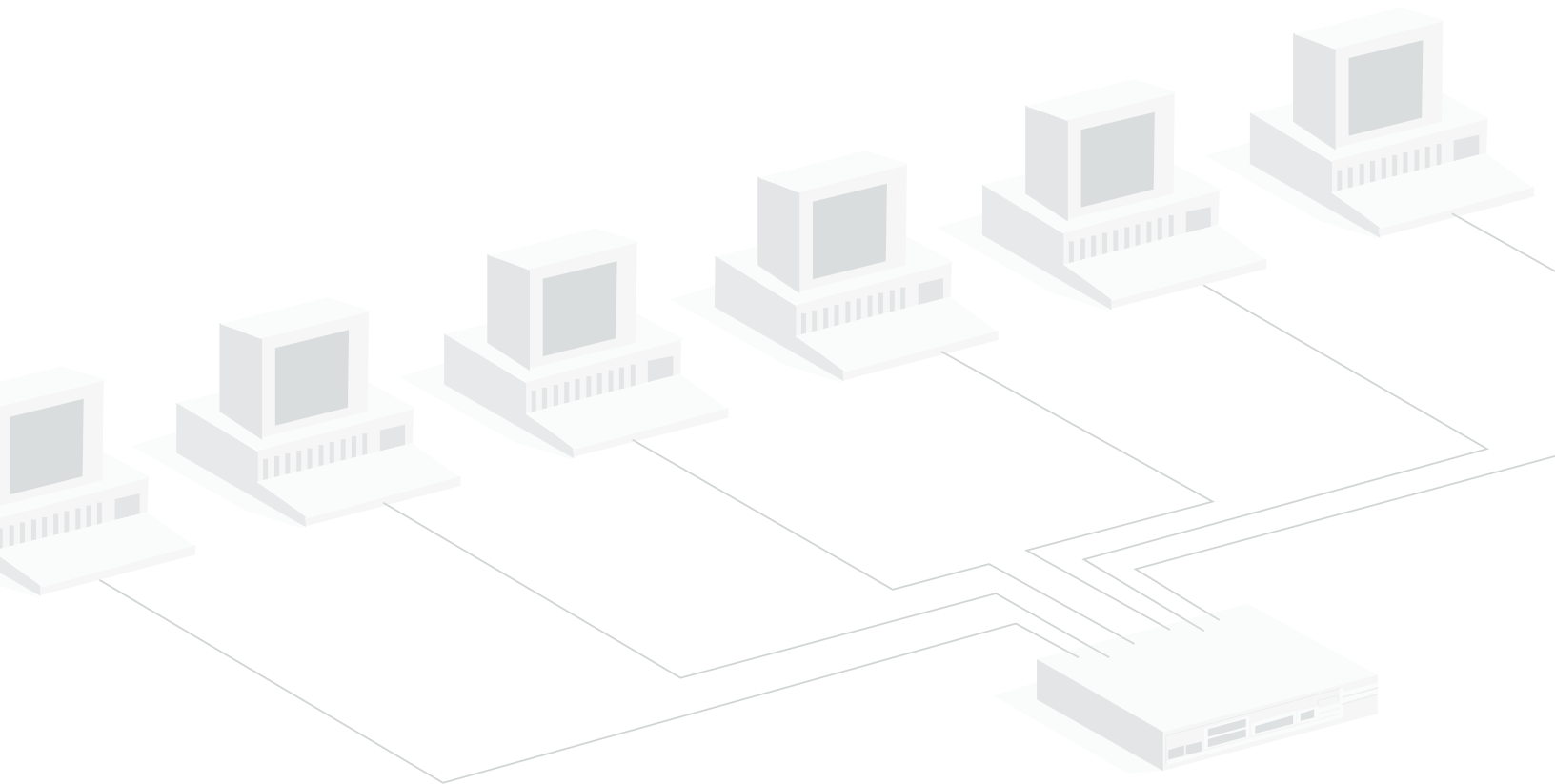


Network Instruments' Observer[®] and VLAN Analysis

As IT departments continue to implement Virtual Local Area Networks (VLANs) to contain broadcast traffic, load-balance and enhance data security, the need to effectively monitor and troubleshoot VLANs becomes more apparent. This white paper illustrates some of the benefits a VLAN-ready network analyzer provides in managing VLAN configurations.



Summary

Does your network analyzer have the necessary features to effectively deploy and maintain VLAN infrastructure? You should look for the ability to measure traffic levels by VLAN, list stations by VLAN, and view VLAN port assignments. These features are essential not only for successful VLAN deployment and upgrade, but will make day-to-day network troubleshooting more efficient and less costly as well.

Keywords

Observer, Probe, VLAN, 802.1Q, ISL, segment, broadcast domain

Overview

VLANs are proliferating in corporate networks for a number of good reasons:

- to contain broadcast traffic
- to act as a load balancing tool
- to enhance data security

Along with the benefits of VLANs come some maintenance and troubleshooting challenges. Does your network analyzer "do VLANs?" This white paper presents examples of how Network Instruments' Observer can effectively manage a VLAN installation.

So you've set up some VLANs. Now what?

Whether the purpose of your VLAN is primarily security or load balancing, setup verification and monitoring are crucial for maintaining VLAN health and security. Here are some of the questions you should get answered:

- Are traffic levels for each VLAN at expected levels?
- Are any unexpected stations showing up in any of the VLANs?
- Do any servers or other sensitive network devices belong to VLANs that they should not belong to?
- What are the VLAN port assignments on your switches?

Even after initial setup, when it comes time to troubleshoot or upgrade your network, having answers to these questions at your fingertips will help you keep your network running smoothly.

Viewing Traffic and Stations by VLAN

For example, Widgetco, Inc. has hundreds of in-store point-of-sale terminals on its network that are (in theory) isolated from general corporate network traffic by being part of a dedicated VLAN. After an acquisition, Widgetco added dozens of new point-of-sale terminals to its network. Corporate LAN response went into the tank. Why? Were stations being assigned to the wrong VLAN?

Having a VLAN-aware analyzer like Observer makes it easy to see a breakdown of total traffic (or each station's traffic) by VLANs:

Observer's VLAN statistics display is divided into two tabs: **VLAN Stations** and **VLAN Summary**.

The **VLAN Summary** tab lets you focus on VLAN-level statistics by omitting station-level statistics. For example, Widgetco's system administrator can quickly determine if traffic levels on the corporate VLAN have become extraordinarily high.

VLANs	Packets	Packets %	Packets /sec	Bytes	Bytes %	Bytes /sec	Broadcasts	Multicasts	Utilization (%)
1	7315	25.065	35.600	2.02e6	25.650	9900.948	909	837	23.869 0.793
2	7329	25.113	35.676	1.92e6	24.395	9406.511	899	887	24.369 0.752
3	14540	48.822	71.175	3.93e6	49.907	19243.437	1848	1756	24.787 1.539

The administrator notices heavier than normal traffic on VLAN 3. What is the source of all this extra traffic? She decides to look at the VLANs by station to find out.

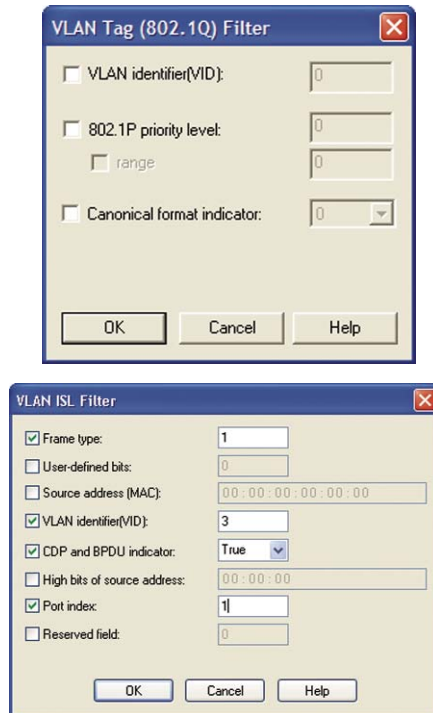
Observer's **VLAN Stations** shows what stations comprise each VLAN, what VLAN(s) a station belongs to, and traffic totals by station or by VLAN. You can think of it as a "top talkers" for VLANs.

VLANs	Stations	Packets Tx	Packets	Packets Total	Packets /sec	Bytes Tx	Bytes Rx	Bytes Total	Bytes /sec	Broadcasts Tx	Multicasts Tx
3	Cisco [50-B5-B6]	3034	2030	5792	6.059	6.450	1.88e6	1.85e6	3.74e6	13.327	5150.437
3	Wd [8E-02-9C]	2795	3393	6100	5.509	7.634	972362	310186	1.28e6	7.101	2656.702
3	Wd [0F-09-D2]	2313	1190	3493	4.559	6.317	1.83e6	83171	1.91e6	13.526	5002.029
3	3Com [9F-42-C1]	1990	3575	5565	3.523	5.435	125762	246448	372210	0.929	343.480
3	Cisco [50-B5-B6]	1601	1391	2992	3.156	4.373	572477	965248	1.53e6	7.182	2656.016
2	Cisco [50-B5-B6]	1525	1328	2953	3.006	4.165	504388	880617	1.38e6	6.827	2524.676
2	Wd [8E-02-9C]	1438	1752	3190	2.835	3.927	497521	180548	658069	3.674	1358.823
1	Wd [8E-02-9C]	1300	1728	3028	3.572	4.625	157634	620226	3.416	1263.425	169
3	3Com [44-04-58]	1237	411	1648	2.428	3.378	98544	26226	125170	0.720	269.142
3	Cisco [52-38-B5]	1204	0	1204	2.373	3.288	237232	0	237232	1.762	647.525
1	Wd [0F-09-D2]	1182	626	1811	2.330	3.228	952256	45089	997344	7.033	2600.789
3	Wd [76-E1-C3]	1159	1514	2673	2.205	3.185	81791	1.87e6	1.95e6	6.604	223.387
2	Wd [0F-09-D2]	1126	574	1700	2.220	3.075	867891	40582	908473	6.409	2370.345
1	3Com [9F-42-C1]	1009	1836	2845	1.989	2.756	63780	124332	188112	0.471	174.195
2	3Com [9F-42-C1]	960	1820	2780	1.892	2.622	60528	123816	184344	0.447	165.313
3	Intel [08-1E-85]	812	811	1623	1.601	2.218	74708	65862	140570	0.952	204.042
3	Lenovo [30-57...]	799	0	799	1.575	2.182	89910	0	89910	0.664	245.561
3	Intel [C8-F6-57]	794	777	1571	1.565	2.169	79866	290328	370194	0.950	218.129
3	3Com [80-AC-62]	778	372	1150	1.534	2.125	120652	353712	474364	0.891	329.523
3	Intel [08-EE-EB]	777	794	1571	1.532	2.122	290328	79866	370194	2.144	792.940

The Administrator quickly determines that some of the recently-added point of sale terminals were inadvertently added to the corporate HQ VLAN.

Filtering by VLAN ID

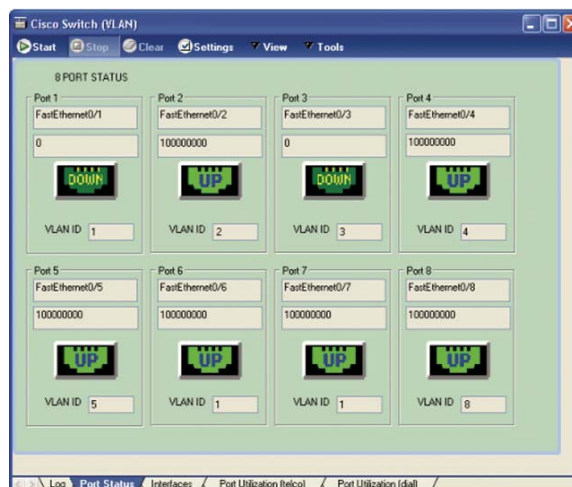
It can often be useful to limit packet captures to particular VLANs (or to exclude particular VLANs) when troubleshooting a network on which VLANs are implemented. A mature analyzer such as Network Instruments' Observer offers more robust filtering of VLAN header fields, for both 802.1Q and ISL VLANs:



By having a fully-featured analyzer that is also aware of VLAN headers, your toolkit for troubleshooting VLAN and general network problems is complete. The ability to focus an analyzer's entire array of measurement tools on a particular VLAN or group of VLANs essentially gives you a "virtual analyzer" for your virtual LANs.

Displaying VLAN Port Assignments

Knowing which VLAN has been assigned to a switch port can be indispensable in troubleshooting connection problems. Although you could theoretically keep up-to-date records of VLAN port assignments, in the real world no one ever has time for this housekeeping task. You could also look up the information through the switch's administrative interface when necessary, but it is much more convenient to have this information available directly from your analyzer. If your analyzer supports SNMP agent queries, most VLAN-capable switches' SNMP agents can be queried for VLAN port assignments. The following screenshot from Network Instruments' Observer Suite product shows a form query that displays VLAN port assignments for an 8-port Cisco switch:



Conclusion

To efficiently deploy, maintain, and troubleshoot a network that deploys VLANs requires a VLAN-aware analyzer. Network Instruments' Observer offers numerous advantages for VLAN analysis including VLAN modes, filtering options and formats for displaying VLAN port assignments. Being able to see VLAN information within the context of other metrics provided by an analyzer (and the reverse) makes it much easier to separate VLAN configuration problems from general network problems, and thus keep your network running smoothly.