

White Paper

The Observer Platform 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

The Observer® Performance Management Platform, VLAN, 802.1Q, ISL, segment, broadcast domain

VLAN summary tab lets you rapidly assess overall corporate network performance health.

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 the Observer Platform can effectively manage a VLAN installation.

So You've Set Up Some VLAN's. 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 solution like Observer Analyzer makes it easy to see a breakdown of total traffic (or each station's traffic) by VLANs:

The Observer Platform'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.

VLAN	Tx	Rx	%	Packets /sec	Bytes	Bits /sec	Broadcasts	Multicasts	3Brdcast+Multicast/Pkts	Utilization (%)
2	14	0.218	0.000	996	0.054	0.000	3	11	100,000	0.000
17	1038	22,543	0.000	1,596	94,935	0.000	0	0	0.000	0.000
101	437	9,912	0.000	39127	2,049	0.000	101	2	22,570	0.000
202	2	0.005	0.000	136	0.007	0.000	0	0	0.000	0.000

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.

The Observer Platform'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.

VLAN	Station	Tx	Rx	Total	%	Packets /sec	Bytes	Total	%	Bits /sec
17	Apple [80:0C:8E] 0	530	530	1,060	0.000	0.000	806841	806841	0.000	0.000
17	Sony [11:6C:CE] 530	0	530	530	12.021	0.000	806641	0	43.351	0.000
101	Dlink [63:9C:6E] 339	0	339	339	7.689	0.000	24338	0	1.308	0.000
101	Cisco [C8:14:80] 0	334	334	668	0.000	0.000	23890	23890	0.000	0.000
17	DELL [00:19:7F] 259	284	273	557	0.000	0.000	428269	36226	22.640	0.000
17	ASUS [77:96:06] 0	162	162	324	0.000	0.000	246564	246564	0.000	0.000
17	Qipade [23:89:24] 24	127	151	278	0.044	0.000	36728	192254	229822	1.963
17	Intel [19:1F:84] 144	0	144	144	3.260	0.000	219132	0	219132	11.777
17	Cisco [80:18:8C] 0	144	144	288	0.000	0.000	219132	219132	0.000	0.000
3	Cisco [96:12:0F] 86	0	86	86	1.951	0.000	8526	0	8526	0.261
0	ASUS [1A:21:17] 53	26	82	108	1.002	0.000	3916	2276	6932	0.255
17	Intel [57:72:41] 43	0	43	43	1.113	0.000	74579	45279	26300	2.099

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:

VLAN Tag (802.1Q) Filter

VLAN identifier(VID): 0

802.1P priority level: 0

range: 0

Canonical format indicator: 0

OK Cancel Help

VLAN ISL Filter

Frame type: Ethernet (0)

User field (4 bit Frame type extension)

User defined bits (non-Ethernet): 0 Bits 4,5,6,7

User defined bits (Ethernet): 0 Bits 4,5

Priority (Ethernet): 0 Bits 6,7

Source address (MAC): 00:00:00:00:00:00

High bits of source address: 00:00:00

VLAN Identifier (VID): 0

CDP and BPDU indicator: False

Port Index: 0

Reserved field: 0

OK Cancel Help

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.

Full featured analyzers enable comprehensive troubleshooting of vlan issues within the context of the entire network.

Conclusion

To efficiently deploy, maintain, and troubleshoot a network that deploys VLANs requires a VLAN-aware analyzer. The Observer Platform offers numerous advantages for VLAN analysis including VLAN modes and flexible filtering options. 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.



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