Network Management Tools

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1. Network Monitoring Hardware

The last two tutorials were devoted to software tools; now we'll shift gears a bit and look at some hardware tools that you may find useful in monitoring and managing your network.

1a. Environmental Monitors

Environmental monitors are designed to monitor the temperature, humidity, power, and air flow in an area or in a device. Temperature and humidity are both critical factors in the health of computing equipment.

Racks of computing devices, all humming along at once, generate quite a bit of heat. High temperatures lead to CPU overheating, which in turn leads to hardware either rebooting or shutting off entirely. Computing hardware works best in an environment where the temperature is slightly cold for human comfort (that's why server rooms are usually kept cold!) but not so cold that frost builds up (and then melts, causing short-circuiting).

Electronics can't tolerate high humidity for very long because it leads to corrosion of electrical parts followed by shorts and other failures. On the other hand, low humidity sounds good on paper, but with it comes static electricity buildup in the air, which can fry computer parts if it reaches them. Humidity should be monitored with an eye toward a happy medium of about 50% humidity.

A temperature and humidity monitor can save you and your precious devices from a total meltdown. By their very nature, networks often include lots of machines placed close together in one or several location(s)—like server rooms.

> **(?) DID YOU KNOW**
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> Modern temperature/humidity monitoring systems can provide multiple sensors feeding data to a single control point. Now we can track the temperature much more accurately in our server rooms dynamically, and in real time. The central control point is usually equipped with HTTP software that can send alerts and provide alarms via a browser, should your server room experience a warming event.

Temperature/humidity monitors also come in a variety of flavors. They vary in size and cost and come in hardware and/or software varieties. The kind you need varies and is based on the size of the room and the number of devices in it. You can even get one that will just monitor your PC's internal heat.

> **TERM TO KNOW**
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> **Environmental Monitors**
> Monitoring systems enable you to actively monitor the conditions in your rack, server room, data center, or anywhere else you need to protect critical assets.

1b. Voltage Event Recorders

Alternating current (AC) is basically the food that PCs and other network devices require in specific amounts to function properly. In the United States, it is normally 110 volts and changes polarity 60 cycles a second (60 hertz). These values are referred to as **line voltage**. Any deviation from these values can create major problems for your PC or other electronics—like death. This is why we have **surge protectors**. These little saviors use a special electronic circuit that monitors the incoming voltage level and trips a circuit breaker when the voltage level reaches critical mass, which is known as the **overvoltage threshold**. However, surge protectors aren't particularly smart; they can't do much other than block power surges.

A **voltage event recorder** doesn't suppress surges or protect equipment, but it does do something that a surge protector doesn't: it can troubleshoot and even provide preventative maintenance on your entire electrical system, whether it is for a home or a huge factory.

Voltage event recorders are typically small devices that plug into a wall and, over time, record the power quality of a given circuit. You would typically use a voltage event recorder for the applications described in the table below.

Recording Voltage	The voltage event recorder monitors and records the supply voltage and checks whether the socket outlet is providing voltage within specifications.
Measuring Distortion	The device measures frequency and harmonics, and it checks whether your uninterruptible power supply (UPS) system is functioning correctly.
Measuring Flicker	It checks the switching loads on lighting systems.

Capturing Voltage Transients	It can help you find intermittent, momentary events that may be affecting your equipment; the full waveform is captured with date, time stamp, and duration. But you still have to do more to ensure the vitality of your electronic devices because they're very sensitive to temperature as well. This means you also need a way to monitor the temperature of the place(s) where your equipment is stored.

📄 **TERMS TO KNOW**

Line Voltage

The electrical voltage delivered by an AC outlet.

Surge Protector

A device designed to protect electrical equipment from damage due to overvoltage conditions.

Overvoltage Threshold

The amount of overvoltage that triggers a surge protector to activate.

Voltage Event Recorder

Recorders that display, record, and report voltage anomalies.

Recording Voltage

The voltage event recorder monitors and records the supply voltage and checks whether the socket outlet is providing voltage within specifications.

Measuring Distortion

The device measures frequency and harmonics, and it checks whether your uninterruptible power supply (UPS) system is functioning correctly.

Measuring Flicker

It checks the switching loads on lighting systems.

Capturing Voltage Transients

It helps determine intermittent, momentary events that may be affecting your equipment; the full waveform is captured with date, time stamp, and duration.

1c. Certifiers

Certification testers—or **certifiers**—are used to determine whether your network meets specific International Organization for Standardization (ISO) or Telecommunications Industry Association (TIA) standards (Cat 5e, Cat 6, or Cat 7).

Basically, a certifier is a combination cable tester and network analyzer, only better because it comes with more options. This is wonderful because it makes your job easier and makes you seem smarter to everyone around you—you're only as good as your tools, right? A good certifier will test the performance and response times of network resources like web, file, email, and even DNS and Dynamic Host Configuration Protocol (DHCP) servers. And, at the same time, it will certify your full Category 6 cable installation. After it finishes all this, you can provide your boss with a detailed network test report complete with dazzling, colorful graphics to make it simple to explain and understand—voilà! You're instantly the genius of the day.

To get these smarts, all you need is a lot of money. These products are not for the small office/home office (SOHO) market because they cost thousands.
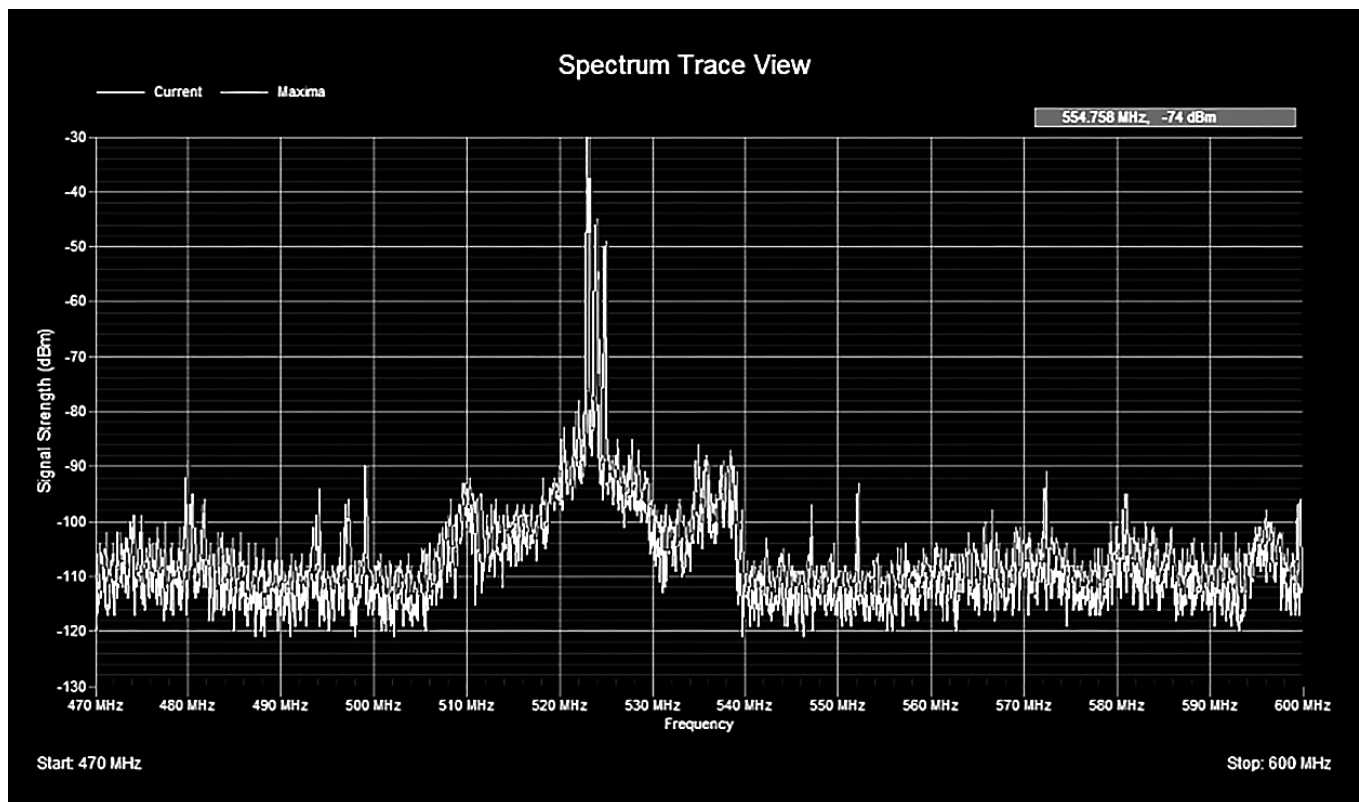
1d. Spectrum Analyzers

Spectrum analyzers are primarily used to identify and measure the strength of radio signals that are present in the area. It can visually display these signals by frequency on the device. These devices are used to locate sources of inference that may impact the operation of a wireless network. The following screenshot illustrates a spectrum analyzer showing the relative use of each channel in the area.

📋 **SUMMARY**

In this lesson, you learned about **networking monitoring hardware** and building and testing cables. Network monitoring hardware covered included **environmental monitors**, **voltage event recorders**,

certifiers, and **spectrum analyzers**.

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📄 TERMS TO KNOW

Capturing Voltage Transients

It helps determine intermittent, momentary events that may be affecting your equipment; the full waveform is captured with date, time stamp, and duration.

Certifier

A tester that determines whether your network meets specific ISO or TIA standards.

Environmental Monitors

Monitoring systems enable you to actively monitor the conditions in your rack, server room, data center, or anywhere else you need to protect critical assets.

Line Voltage

The electrical voltage delivered by an AC outlet.

Measuring Distortion

The device measures frequency and harmonics, and it checks whether your uninterruptible power supply (UPS) system is functioning correctly.

Measuring Flicker

It checks the switching loads on lighting systems.

Overvoltage Threshold

The amount of overvoltage that triggers a surge protector to activate.

Recording Voltage

The voltage event recorder monitors and records the supply voltage and checks whether the socket outlet is providing voltage within specifications.

Spectrum Analyzer

A device that identifies and measures the strength of radio signals.

Surge Protector

A device designed to protect electrical equipment from damage due to overvoltage conditions.

Voltage Event Recorder

Recorders that display, record, and report voltage anomalies.