established, and related connections may all be taken into consideration when filtering packets. Stateful inspection is sometimes called connection tracking.

stationary batteries. Batteries designed to have a fixed location and in scenarios where the power consumption is more or less irregular. Stationary batteries can accommodate deep discharge cycles, but they are not designed to produce high currents in brief periods of time. See also: ***lead-acid batteries***

structure. In ***NEC2***, a numerical description of where the different parts of the antenna are located, and how the wires are connected up. See also: ***controls***

subnet mask see ***netmask***

subnets. A subset of a range of IP networks, defined by ***netmasks***.

switch. A network device that provides a temporary, dedicated connection between communicating devices. See also: ***hub***.

switching conversion. A DC voltage conversion method that uses a magnetic component to temporarily store the energy and transform it to another voltage. Switching conversion is much more efficient than ***linear conversion***.

T

target. In netfilter, the action to be taken once a packet matches a rule. Some possible netfilter targets include ***ACCEPT***, ***DROP***, ***LOG***, and ***REJECT***.

TCP see ***Transmission Control Protocol***

TCP acknowledgment spoofing

TCP window size. The TCP parameter that defines how much data that may be sent before an ACK packet is returned from the receiving side. For instance, a window size of 3000 would mean that two packets of 1500 bytes each will be sent, after which the receiving end will either ACK the chunk or request retransmission.

TCP/IP see ***Internet protocol suite***

TCP/IP network model. A popular simplification of the OSI network model that is used with Internet networks. The TCP/IP model consists of five interdependent layers, from the physical through the application. See also: ***OSI network model***.

tcpdump. A popular open source packet capture and analysis tool available at *http://www.tcpdump.org/*. See also: ***WinDump*** and ***Wireshark***.

Temporal Key Integrity Protocol (TKIP). An encryption protocol used in conjunction with ***WPA*** to improve the security of a communications session.

thermal solar energy. Energy collected from the sun in the form of heat. See also: ***photovoltaic solar energy***

thrashing. The state when a computer has exhausted the available RAM and must use the hard disk for temporary storage, greatly reducing system performance.

throughput. The actual amount of information per second flowing through a network connection, disregarding protocol overhead.

throughput testing tools. Tools that measure the actual bandwidth available between two points on a network.

Time To Live (TTL). A TTL value acts as a deadline or emergency brake to signal a time when the data should be discarded. In TCP/IP networks, the TTL is a counter that starts at some value (such as 64) and is decremented at each router hop. If the TTL reaches zero, the packet is discarded. This mechanism helps reduce damage caused by routing loops. In DNS, the TTL defines the amount of time that a particular zone record should be kept before it must be refreshed. In Squid, the TTL defines how long a cached object may be kept before it must be again retrieved from the original website.

TKIP see **Temporal Key Integrity Protocol**

TNC connector. A common, sturdy threaded microwave connector.

Tor (*http://www.torproject.org/*). An **onion routing** tool that provides good protection against traffic analysis.

traceroute / tracert. A ubiquitous network diagnostic utility often used in conjunction with ping to determine the location of network problems. The Unix version is called traceroute, while the Windows version is tracert. Both use ICMP echo requests with increasing TTL values to determine which routers are used to connect to a remote host, and also display latency statistics. Another variant is tracepath, which uses a similar technique with UDP packets. See also: **mtr**.

traction batteries see **lead-acid batteries**

Transmission Control Protocol (TCP). A session oriented protocol that operates at the Transport Layer, providing packet reassembly, congestion avoidance, and reliable delivery. TCP is an integral protocol used by many Internet applications, including HTTP and SMTP. See also: **UDP**.

transmission power. The amount of power provided by the radio transmitter, before any antenna gain or line losses.

transparent bridging firewall. A firewall technique that introduces a bridge that selectively forwards packets based on firewall rules. One benefit of a transparent bridging firewall is that it does not require an IP address. See also: **bridge**.

transparent cache. A method of implementing a site-wide web cache that requires no configuration on the web clients. Web requests are silently redirected to the cache, which

makes the request on behalf of the client. Transparent caches cannot use authentication, which makes it impossible to implement traffic accounting at the user level. See also: **site-wide web cache**, **Squid**.

transparent proxy. A caching proxy installed so that users' web requests are automatically forwarded to the proxy server, without any need to manually configure web browsers to use it.

transport layer. The third layer of the OSI and TCP/IP network models, which provides a method of reaching a particular service on a given network node. Examples of protocols that operate at this layer are **TCP** and **UDP**.

trending. A type of network monitoring tool that performs unattended monitoring over long periods, and plots the results on a graph. Trending tools allow you to predict future behavior of your network, which helps you plan for upgrades and changes.

TTL see **Time To Live**

tunnel. A form of data encapsulation that wraps one protocol stack within another. This is often used in conjunction with encryption to protect communications from potential eavesdroppers, while eliminating the need to support encryption within the application itself. Tunnels are often used conjunction with **VPN**s.

U

U.FL. A very tiny microwave connector commonly used on mini-PCI radio cards.

UDP see **User Datagram Protocol**

unintentional users. Laptop users who accidentally associate to the wrong wireless network.

Unshielded Twisted Pair (UTP). Cable used for 10baseT and 100baseT Ethernet, consisting of four pairs of twisted wires.

Useful Capacity (C_u). The usable capacity of a battery, equal to the product of the **Nominal Capacity** and the **Maximum Depth of Discharge**.

User Datagram Protocol (UDP). A **connectionless protocol** (at the **transport layer**) commonly used for video and audio streaming.

UTP see **Unshielded Twisted Pair**

V

valve regulated lead acid battery (VRLA) see **lead-acid batteries**

vertical polarization. An electromagnetic field with the electric component moving in a linear vertical direction. Most wireless consumer electronic devices use vertical polarization. See also: **circular polarization, vertical polarization**

Very Small Aperture Terminal (VSAT). One of several standards used for satellite Internet access. VSAT is the most widely deployed satellite technology used in Africa. See also: **Broadband Global Access Network (BGAN)** and **Digital Video Broadcast (DVB-S)**.

video sender. A 2.4 GHz video transmitter that can be used as an inexpensive **signal generator**.

Virtual Private Network (VPN). A tool used to join two networks together over an untrusted network (such as the Internet). VPNs are often used to connect remote users to an organization's network when traveling or working from home. VPNs use a combination of encryption and tunneling to secure all network traffic, regardless of the application being used. See also: **tunnel**.

VoIP (**Voice over IP**). A technology that provides telephone-like features over an Internet connection. Examples of popular VoIP clients include Skype, Gizmo Project, MSN Messenger, and iChat.

VPN see **Virtual Private Network.**

VRLA see **valve regulated lead acid battery**

VSAT see **Very Small Aperture Terminal**

Very Small Aperture Terminal (VSAT). One of several standards used for satellite Internet access. VSAT is the most widely deployed satellite technology used in Africa.

See also: **Broadband Global Access Network (BGN)** and **Digital Video Broadcast (DVB-S)**.

W

WAN see **Wide Area Network**

War drivers. Wireless enthusiasts who are interested in finding the physical location of wireless networks.

wavelength. The distance measured from a point on one wave to the equivalent part of the next, for example from the top of one peak to the next. Also known as **lambda (λ).**

WEP see **Wired Equivalent Privacy**

wget. An open source command line tool for downloading web pages. *http://www.gnu.org/software/wget/*

Wi-Fi. A marketing brand owned by the Wi-Fi Alliance that is used to refer to various wireless networking technologies (including 802.11a, 802.11b, and 802.11g). Wi-Fi is short for **Wireless Fidelity**.

Wi-Fi Protected Access (WPA). A fairly strong **link layer encryption** protocol supported by most modern **Wi-Fi** equipment.

Wi-Spy. An inexpensive 2.4 GHz spectrum analysis tool available from *http://www.metageek.net/*.

Wide Area Network (WAN). Any long distance networking technology. Leased lines, frame relay, DSL, fixed wireless, and satellite all

typically implement wide area networks. See also: ***LAN***.

wiki. A web site that allows any user to edit the contents of any page. One of the most popular public wikis is *http://www.wikipedia.org/*

window scale. A TCP enhancement defined by RFC1323 that allows TCP window sizes larger than 64KB.

WinDump. The Windows version of tcpdump. It is available from *http://www.winpcap.org/windump/*

Wired Equivalent Privacy (WEP). A somewhat secure ***link layer encryption*** protocol supported by virtually all 802.11a/b/g equipment.

Wireless Fidelity see ***Wi-Fi***.

wireshark. A free network protocol analyzer for Unix and Windows. *http://www.wireshark.org/*

WPA see ***Wi-Fi Protected Access***

Z

Zabbix (*http://www.zabbix.org/*) A realtime monitoring tool that logs and notifies a system administrator about service and network outages.