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# **Unified Threat Management**

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- Improve network performance and reduce complexity
- Consolidate management of essential security technologies

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# ***Unified Threat Management***

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***2nd Fortinet Special Edition***

**by Ed Tittel**

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## Unified Threat Management For Dummies®, 2nd Fortinet Special Edition

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# Introduction



**V**ery few security technologies leap out of nowhere and make a huge impact on the industry. Unified threat management, also known as UTM, is one of those few. UTM presents buyers with the opportunity to improve their network security and performance while reducing network complexity and costs.

Today's networking environment and threat landscape are changing constantly — new devices, applications, and threats appear almost daily. Organizations of all sizes struggle to enable secure access for users on the latest mobile device while blocking the latest threats hidden inside application traffic from social media sites. It's a tough fight.

One traditional response to new threats has been to add new stand-alone security technologies to a network. Unfortunately, this adds complexity and cost, as each new technology means a new device to deploy, a new set of policies to configure, and a new management console to monitor. And, because each new stand-alone product isn't integrated with the existing product set, it also creates potential blind spots in an organization's security strategy, through which threats could pass undetected.

At the same time, networking itself has become more complex as Internet bandwidth has increased, as have the number of connected devices (and thus connection ports). More mobile users require wireless access to the network and cloud services that change network traffic flows and topologies. As a result of all these changes, today's networks often bristle with wired switch ports, wireless access points, traffic optimization devices, and more.

This book presents, explores, and explains the features and benefits that UTM can deliver to your network, within the context of today's rapidly evolving network and threat landscapes.

## How This Book Is Organized

The chapters in this book demystify the components and technologies used in UTM, and then some.

- ✓ **Chapter 1: The Need for Consolidated Networking and Security** explains the challenges to securing evolving networking environments — more complex networks, the rise in crimeware, and more.
- ✓ **Chapter 2: Why Traditional Firewalls Can't Keep Up with Today's Threats** explains the problems of legacy networking, security technology, and much more.
- ✓ **Chapter 3: UTM Brings Order to the Chaos** describes how a consolidated approach to networking and network security improves protection and performance while lowering cost and complexity.
- ✓ **Chapter 4: A Closer Look at Unified Threat Management** digs into more detail about the different inspection techniques, hardware processors, and networking functions that provide the muscle for UTM software.
- ✓ **Chapter 5: Unified Threat Management in Action** examines the components of UTM, from application control to web filtering, and how UTM has been implemented in real-world organizations.
- ✓ **Chapter 6: Ten (Okay, Eleven) Key Questions to Ask When Evaluating UTM Solutions** poses questions to ask before making any UTM purchase.
- ✓ **Glossary:** Here, we define acronyms and key terms.

## Icons Used in This Book

Every *For Dummies* book sprinkles *icons* throughout its margins to call attention to text worth noting. Here are the icons in this book.



These are points to keep in mind as you immerse yourself in the world of unified threat management.





Sometimes we share technical information that goes beyond the basics. This icon tells you that the related text delivers more UTM details than absolutely necessary. You can skip it if you like!



This icon sets out on-target information to help you maximize the benefits of enhancing network security using unified threat management.



This icon flags information that you should note and use to avoid dangerous situations.

## ***Beyond the Book***

Although this book is chock full of information, there's only so much we can cover in 72 short pages! So, if you find yourself at the end of this book thinking "Gosh, this was an amazing book. Where can I learn more about unified threat management?" just go to [www.fortinet.com](http://www.fortinet.com).



## Chapter 1

---

# The Need for Consolidated Networking and Security

---

### *In This Chapter*

- ▶ Securing an ever-changing network
  - ▶ Reining in applications
  - ▶ Fending off crimeware
- 

**I**n today's increasingly interconnected world, networks change constantly. New public and private cloud services, access methods, and even devices continue to drive network evolution at a frenetic pace. As a result, organizations of all sizes face challenges in maintaining control over network and security policies.

Unfortunately, many organizations continue to take a traditional approach to networking and security in spite of the rapid evolution in IT that has made today's environments much more complex. At the same time, the threat landscape continues to evolve with new attack avenues and techniques. Outdated security approaches leave organizations extremely vulnerable, especially given network complexity. A different approach is required.

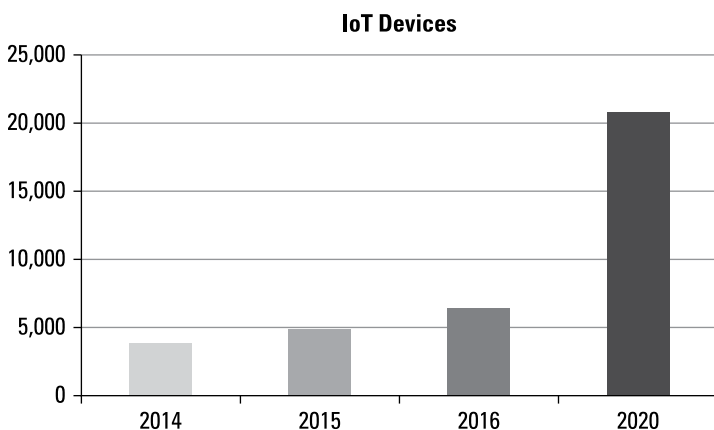
But before we can discuss what's needed, in this chapter we take a closer look at how the network and threat landscape have evolved in the last few years, and the implications for security: Some are good, some are bad, and some are downright ugly.

## *The Good: More and Better Network Access*

The evolution and incredible proliferation of networking and security technology have produced many benefits across a wide spectrum of systems and users. These benefits include network access, anytime and anywhere. Users can utilize ever-improving network bandwidth across both wired and wireless networks for faster access to more data and services that are hosted on-premise or in the cloud.

### *Fast and secure anytime access*

Today, users access corporate data, applications, and services in many ways — from around the office to around the world. They can use any device with a network connection, including smartphones and tablets, to access systems and networks inside a corporate firewall. And due to the prevalence of the Internet of things (IoT), “users” may be the devices themselves. The number of devices has exploded (see Figure 1-1).



**Figure 1-1:** The proliferation of devices.

Consider the following:

- ✓ Three billion smartphones and tablets were shipped in 2015 (IDC).
- ✓ The average small business employee uses 3.5 devices for work each day (Spiceworks).
- ✓ An estimated 6.4 billion connected “things” will be in use in 2016, growing to 20 billion by 2020 (Gartner).

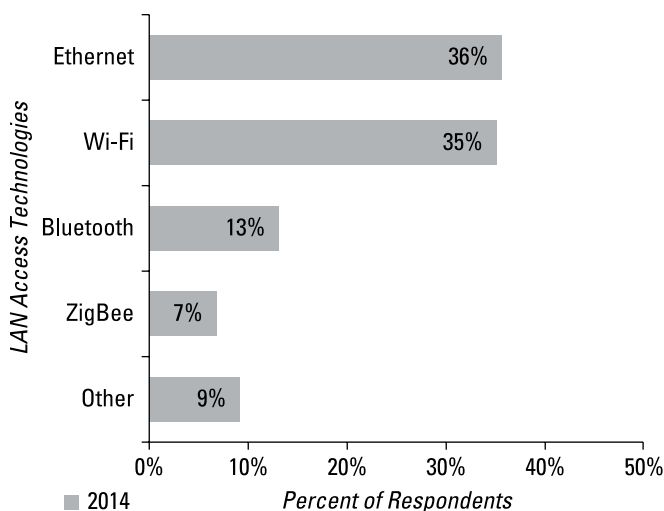
It’s no surprise, then, that Internet bandwidth for most small businesses is bursting at the seams. Many are introducing larger “pipes,” more wired connections (switch ports), and pervasive wireless coverage (access points).

At the same time, the expected adoption of faster wireless performance is expected to explode by 2017 according to Infonetics. The 802.11ac is a standard for the wireless transmission of data, which extends earlier protocol specifications such as 802.11n for higher performance. Whereas the previous standard was only capable of delivering 100 to 250 Megabits per second, this newer approach promises to deliver 1 Gigabit per second or more over the wireless spectrum according to IEEE.

Further, that same wireless connectivity is not only the primary access method for 30 percent of users, but a full 64 percent of access for connected devices, according to Infonetics. See Figure 1-2.

This needs for connectivity and access are driven by more than connectivity to the company network. Small businesses, in particular, are quickly adapting to cloud-based services. Most businesses rely on two or more cloud-based services today. The most common applications are back-office functions, utilized by a majority of U.S. small businesses.

A lot of good things have happened on corporate networks, and a lot of those things involve new technologies and new uses for existing systems and information assets. But these changes also add to the burden of maintaining security and require forward thinking to ensure that levels of protection and security keep up with new uses, new forms of access, and new forms of communication.



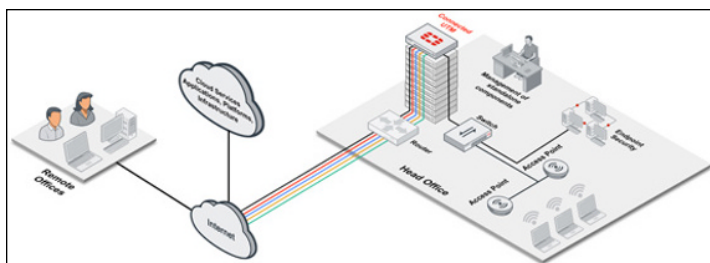
**Figure 1-2:** LAN access technologies.

## *The Bad: Greater Complexity Brings Risk*

The huge increase in the numbers of devices and the greater need for connectivity and cloud services, along with an overall expansion of organization size, means that networks today look much different than just a couple of years ago (see Figure 1-3). Key changes include:

- ✓ Hybrid networks, encompassing on-premise and cloud-based infrastructure (as well as larger multisite businesses).
- ✓ On-premise networks bristling with switches to connect all manner of IoT and end user devices.
- ✓ Burgeoning wireless infrastructure, providing broad-spectrum coverage.

This all means that small businesses have greater amounts of networking infrastructure to procure, deploy, and manage than ever before.



**Figure 1-3:** The changing look of today's network.



This complexity also presents challenges when it comes to network security. All the benefits of increased and faster wireless connectivity have also made the network perimeter more diffuse. This in turn means that although traditional firewalls that enforce strong boundary protection are still critical to network security, those alone are no longer sufficient protection.

Threat vectors arrive in increasing numbers every day, and from multiple directions. Most networks haven't adopted new strategies to deal with the current situation — and as a result, there seems to be more exposure than ever to security threats, including the following:

- **Cloud-based applications** have been on the rise for several years now, but the capacity to see what's coming in and out of them hasn't improved. For example, SaaS vendors sell a service, hosted external to a business. Such companies rarely provide many details about their technology — customers must trust that the vendor is delivering the service in a secure manner. The end customer has no visibility into potential intellectual property leaking out or malicious code getting in through the application gateway.
- **BYOD** is another fact of life for networks (regardless of a company's official policy on using personal mobile devices within the workplace). Firewall administrators assume a level of security often rooted in outdated security philosophies. User laptops, phones, and wireless access points are all implicitly placed in a zone of trust based solely on their physical locality in the network. This results in a level of trust being given to devices over

which the administrator has no control. The countless numbers of devices that are introduced into modern networks make for ever-increasing challenges for policing and control.

- ✓ **Mobility** also means that users are often “off-network” and beyond the bounds of corporate security measures. In such cases, the only line of defense may be the security software on the computing device. And that assumes the device is corporate issued with security. In certain cases, the use of personal devices, outside of the corporate network, may leave employees and the data they’re using completely unprotected.

This list offers a sample of the attack surfaces that modern networks face. Although most modern networks appear with a generally similar set of tools protecting their edge, internal networks are much more varied in components and operation — rendering the implementation of security tools more complex, and often less effective. These are clear indicators that the network edge is no longer the only place that needs to be secured.

## The Ugly: Criminal Mayhem and Mischief

Today’s threat landscape continues to evolve with new attack avenues and techniques. Beyond the threats of damage or data loss from malware, professional criminals have gone online to ply their unsavory trades. Online crime is an ever-increasing part of the threat landscape, but it’s not the only kind of attack that can target corporations, organizations, and individuals.

Other common online crimes include *malicious mischief* (damage or theft for the thrill of it, instead of for a profit) that springs from political or personal malice. Groups like Anonymous target organizations’ user data and internal content for theft and disclosure as retribution against policies or political and social affiliations.



## Crimeware defined and deplored

*Crimeware* is a class of software that includes source code and developer kits. It's designed to help criminals compromise systems or build their own networks of compromised computers, called *bots*, to do their bidding. Hackers who create these tools follow the model of legitimate software development companies and offer various licensing options or annual support contracts to their criminal clientele.

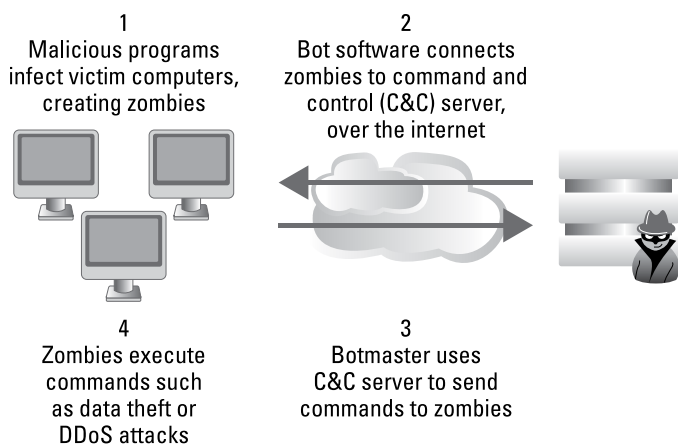
*Crime-as-a-service* takes this a step further, and is delivered by malcontents who offer to steal data or mount attacks for a fee. These individuals have no obvious affiliations or causes (except making money). Such service providers work as contractors to deliver criminal actions online to the highest bidder.

And there's a growing cybercriminal network emerging from the Internet shadows, usually housed in countries where online law enforcement is lax or nonexistent. Often, criminal enterprises are tolerated in exchange for a share of their proceeds. Tools of choice for these online black markets are crimeware and crime-as-a-service offerings.

In the sections that follow, we explore some of the ugliest elements this side of the online universe.

## *Botnets and cyberwarfare*

A *bot* is an individual computer that has been compromised with malware that takes instructions from a criminal. Each such computer is called a bot (short for "robot") and collections of such computers are called *botnets*. Criminal organizations may create and run their own botnets, but the biggest botnets (some of which include hundreds of thousands of bots around the world) are usually available for hire. The crooks that operate botnets are called *botmasters* or *botherders*, and they take instruction from their criminal clientele to program their botnets to undertake various criminal projects. See Figure 1-4.



**Figure 1-4:** An example of a botnet.

Corporations, institutions, government agencies, and other large organizations can fall prey to various kinds of bot attacks. In every case, one computer inside the organization's boundaries will be compromised and added to a botnet. The compromised computer can then serve as a beachhead to attack other systems (internal or external), steal information, transfer funds, or perform other illicit activities.

## ***Ransomware: Pay up, or else. . .!***

*Ransomware* is a special kind of malware to which individuals and organizations sometimes fall prey. Ransomware targets mission-critical systems or applications, and once installed, is very difficult to get rid of. By design, ransomware is nearly impossible to remove without access to keys or codes that only its developers possess. The original ransomware threat can be disinfected from a system; however, the damage often can't be reversed without engaging the attackers themselves.

Essentially, what happens with ransomware is the following: As ransomware infects a system, it makes the system unusable by encrypting various essential files (often using rigorous asymmetric cryptography) and disabling recovery/repair features and capabilities. It then announces itself to its victims after taking control over those files or capabilities. Unless and

until the victim makes payment to unlock what's being held for ransom, the files remain locked and the system is unusable.

This gives the bad guys an unbeatable point of leverage in extracting payment from their targets. Only after paying a ransom does the victim receive the keys necessary to unlock the system or regain access to critical files. Other ransomware locks out systems at the boot level, so you may not even get into your operating system to attempt system recovery. Ransoms typically float around \$100 USD but can jump much higher if there's a high-profile target.



Once a user finds himself or herself reading a ransom note, data has already been encrypted or essential functions disabled, and the damage is essentially done. Traditional firewalls are oblivious to and impotent against such threats.

## *Phishing and spear-phishing attacks*

Outright phishing attacks against organizations occur all the time. Although these attacks may not always involve incorporation of the machine under attack into a botnet, they can and often do involve inadvertent and unwanted disclosure of sensitive and/or regulated information. This data generally includes information with financial value such as credit card numbers and credentials, user account names and passwords, and financial account information for banks, brokerages, or other financial service providers. It may also include user credentials that allow attackers to gain “authorized” entry to the network followed by further compromise.

In the most benign form of phishing attack, an employee or customer of an organization clicks on a link in a fraudulent email, tweet, Facebook post, and so on. This takes the person to a realistic-looking website that requests the individual to log in or otherwise divulge credential information. Cybercrooks use this information to impersonate their victims to steal money, services, or other items of value. Normal phishing attacks don't do much to target specific victims. Most phishing attacks create messages or lures that are designed to appeal to the broadest possible audiences.

These messages, postings, tweets, and so forth are then broadcast far and wide, and victims more or less select themselves for attack.

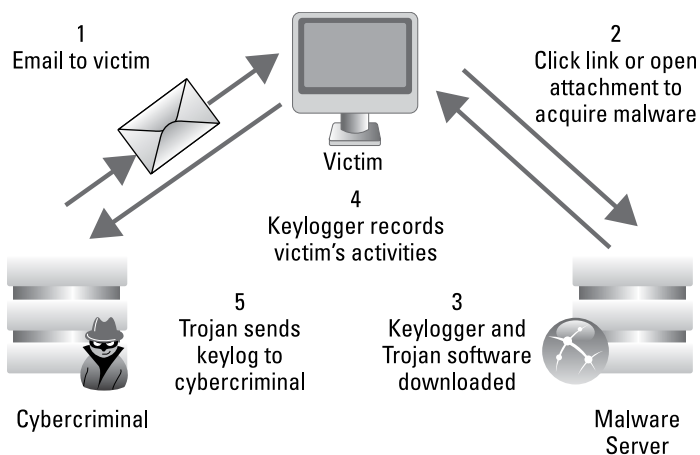
However, businesses and organizations are increasingly falling prey to a more targeted form of phishing. Known as *spear phishing*, such attacks are directed at employees or members of a particular organization. These attacks are often crafted to look like they are from an internal user or come from a trusted partner or service provider (in-house credit union, health insurance provider, and so forth).



Spear phishing uses social engineering to persuade users to open email, tweets, or Facebook posts with links to malicious sites or malware attachments where applicable. Sometimes a link isn't required. Rather, a direct communication request is made via email or even the phone (known as *vishing*). This information is carefully worded to be relevant and interesting to a specific individual or small target audience, to raise the odds of getting prospective victims to swallow their lures. Criminals take advantage of the wealth of online data individuals post about themselves on social media sites to create the content of the spear-phishing message. Spear-phishing attacks can also be used to infect a system with malware to gain desired information, often using infected documents (PDF, doc or docx, and xls or xlsx formats are popular for malicious payloads).

For example, some spear-phishing attacks have been reported to target accounting or financial services professionals within large corporations, because such individuals are likely to handle electronic fund transfers for their organizations. Targeted messages request these individuals to open a file to examine the details of a supposedly fraudulent or questionable transaction. The attachment instead contains malware that infects the target's system. (See Figure 1-5.)

From there, any systems these individuals interact with are monitored closely by the attackers. Credentials are stolen on login, and accounts are compromised. Cybercriminals have also developed sophisticated malware to use in conjunction with these attacks.



**Figure 1-5:** How a spear-phishing attack may infect a victim's computer.

Traditional firewalls are unable to protect against these threats because they lack the capability to inspect the content or prevent access to malicious sites. They also offer no protection against most other forms of cybercrime. A different approach and a different kind of tool are clearly called for.

In Chapter 2, we outline what's needed to stop these threats.



## Chapter 2

---

# Why Traditional Firewalls Can't Keep Up with Today's Threats

.....

### *In This Chapter*

- ▶ Grappling with the problem of inadequate network security
  - ▶ Understanding how stand-alone security devices decrease network visibility
  - ▶ Evaluating firewall performance with stand-alone applications
  - ▶ Examining the costs of traditional security protection on your network
  - ▶ Getting a bird's-eye view of the characteristics of a better solution
- .....

**B**ecause network traffic is so heavily web- and application-based, the ability of legacy security technologies to protect internal networks is increasingly challenged, to say the least. Attacks have become more frequent and more serious. Every day we read about cybercriminals whose attacks have been designed to avoid detection and who keep coming up with more and better ways to steal information. Are they getting the upper hand?

As attacks and their consequences become more dangerous and costly, organizations are learning to their dismay that their existing security infrastructures just can't keep up. Traditional firewalls and security appliances have lost their ability to block such traffic. That means that prevailing tools and technologies can't prevent the worst and most nefarious attacks from affecting or damaging networks.

This chapter looks at traditional security technologies and how the makeup of today's network traffic affects their ability to protect an organization's networks. At the same time, we also look at how a mix of multiple legacy security components can decrease network performance and increase the total cost of ownership (TCO).

## *Inadequate Protection at Best*

Those network devices that sit at the boundary between internal networks and the wild and often wooly Internet have a lot to do to maintain security nowadays. It's become commonplace to inspect and manage traffic crossing the network boundary to enforce policies, to block viruses and malware, to prevent potential intrusions or attacks, and to prevent unauthorized access. At the same time, it's necessary to screen outbound web traffic, to filter inbound traffic of all kinds, and to watch for and block potential intrusion and react quickly to signs of denial of service attacks.

That's a lot of diverse security and network technologies to operate and manage. It's no wonder that traditional methods just aren't keeping up with the onslaught of traffic and the many different kinds of filters that need to be applied to the mix in real time.

## *The problem with legacy firewalls*

One of the first and most basic lines of network perimeter defense is a *firewall*, a device that inspects inbound and outbound traffic on a network. Firewalls were the first widely deployed network security technology when Internet use really began in earnest. The firewall's job is to inspect that traffic and to decide what traffic is allowed to go from outside to inside, and from inside to outside.

But network traffic has changed quite a bit in the past decade (read Chapter 1 for the big picture). A great proportion of traffic on the Internet, and on organizational networks, is now web-based.





Because of the commingling of modern application traffic with everyday web access, traditional port-based firewalls have essentially become blind to the most common type of network traffic. This means that they can't distinguish different types of traffic that use the same port, they can't detect applications that tunnel inside other applications, and they can't see inside encrypted packets either. They can't even block sneaky rogue applications that use nonstandard port numbers.

## ***Evolving firewall technology still can't keep up***

As simple rules for filtering traffic in a firewall proved to be too permissive, firewall vendors deployed new technology to stay abreast of the changing threat landscape. Thus, firewall technology evolved to incorporate more sophisticated methods to protect against new threats.

One important advance in firewall technology was the development of a *proxy server* (or “proxy” for short), which inserts itself between a client on one side of a network connection and a server on the other side. A proxy server sits transparently on the network and checks all packets for policy compliance before forwarding the packets. It reassembles all of the packets in a stream, examining a complete file attachment rather than looking at one packet at a time.

*Stateful packet inspection firewalls* were created to keep track of the state of network connections. These stateful firewalls distinguish legitimate communications from suspicious or malicious types of connections. They allow only packets that corresponded to a valid, recognized, active connection between a client and server. They reject other attempts to connect or transmit.

To provide basic inspection of contents, *deep packet inspection* (DPI) firewalls inspect the payload or data portion of a network packet. DPI provides some protection against attacks from viruses and worms, because it identifies and classifies network traffic based on a collection of characteristic patterns called *signatures* found in the packet payload. Signatures support more comprehensive and effective control and filtering than methods that examine only packet header information. (There's more about DPI later in this chapter.)

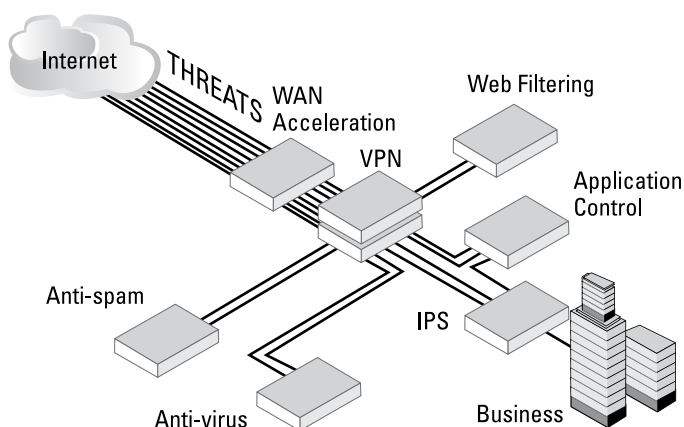


In spite of these advances, firewalls could not stop the evolving threats. With each new firewall technology, the hackers devised new evasion techniques. New threats simply slipped through legacy firewalls and headed right onto the trusted network, attacking clients and servers with gusto and abandon. Network security vendors sought to fight back by creating new technologies to fight the new threats.

## Stand-Alone Products Mean Reduced Network Visibility

Over time, as the threat landscape evolved, organizations began adding specialized or *stand-alone security devices* (appliances or software) to their infrastructures. The intention was that these devices would provide workarounds to the limitations of traditional port-based firewalls.

Each device addresses a specific threat: One appliance provides malware screening, and another provides content filtering of websites and traffic. Still others detect and block intrusions, or add spam filtering and email message handling. Put them all together on a network, and you could have half a dozen or more appliances, each inspecting the stream of traffic moving across the network. See Figure 2-1.



**Figure 2-1:** Multiple devices addressing incoming threats.

## Examples of stand-alone security appliances

Here are some examples of typical stand-alone security appliances that are deployed in a network:

- ✓ **Virtual private network (VPN):** A VPN uses special protocols to move packets of information across the Internet securely. In general, VPN protocols encrypt traffic going from sender to receiver. This makes such traffic appear completely garbled to anyone who might intercept and examine those packets while they're on the Internet. VPNs use encryption to protect the traffic they carry from unauthorized access. Because the VPN packets wrap the encrypted data inside a new protocol envelope — a technique known as *encapsulation* — a VPN creates a private, encrypted “tunnel” through the Internet.
- ✓ **Data loss prevention (DLP):** DLP looks for confidential, proprietary, or regulated data leaving the network. It can prevent the accidental “leakage” of data, such as a customer service representative including account information in a response to an email to a customer. It can also stop the wholesale loss of proprietary data, such as a disgruntled employee forwarding an entire customer contact list to a prospective employer.
- ✓ **Intrusion prevention system (IPS):** An IPS acts as a network's watchdog, looking for patterns of network traffic and activity, and records events that may affect security. An IPS issues alarms or alerts for administrators, and is able to block unwanted traffic. An IPS also routinely logs information as events occur, so they can provide information to better handle threats in the future, or provide evidence for possible legal action.
- ✓ **Web filtering technologies:** These devices block traffic to and/or from a network by IP address, domain name/URL, type of content (for example, “adult content” or “file sharing”), or payload. They maintain a *whitelist* of trusted sites and a *blacklist* of forbidden sites to prevent users from violating acceptable use policies or being exposed to malicious content.



All of these devices were designed to improve a network's security by adding functionality missing from the firewall. However, a patchwork of stand-alone technologies can have the opposite effect on network visibility as well as performance. These threat-specific technologies don't talk to each

other easily (if at all). They lack central management and monitoring because each product operates on its own. Plus, data from individual devices isn't aggregated to create a complete or holistic view. How can you manage the security of a network if you can't really see it end to end?

## *Way-High TCO*

The patchwork approach to security will not only complicate your network — it can cost a lot of money! When you seek to compensate for an inadequate firewall, you must invest in multiple security appliances, thereby adding to your capital expenses (CapEx).

These appliances must be installed, configured, tested, and maintained. Multiple products mean many consoles that must be used to view data, configure policies, and run reports. These tasks require significant technician and/or administrator time, and therefore drive up your operating expenses (OpEx). Maintaining multiple products also requires multiple service and support contracts from different vendors, making the renewal process very costly and time-consuming to handle. Performing different software updates for different products, testing and ensuring the compatibility across all the platforms with different software releases, is another significant management overhead that impacts the cost of ownership.

Plus, any time you install additional security equipment on a network, you're increasing the number of potential points of failure. Any such failure can incur both OpEx and CapEx to effect repairs, depending on the type of failure and its severity, and the time and effort needed to restore operations to normal.

Here's the bottom line: As network security complexity increases, so does the expense required to manage that network. In the long term, it's usually more cost-effective to fix the core problem than to limp along with a system that is weak at its seams. It's also wise to shy away from bandage on top of bandage.



Every administrator should carefully consider the TCO of add-on security appliances versus an integrated solution before making significant infrastructure commitments. The hidden costs to acquire and sustain a handful of stand-alone devices can be much higher than anyone might realize. Once committed to the stand-alone strategy, however, those costs become unavoidable!

## *No More Stand-Alone Technologies?*

If the approach of adding appliance after appliance can't really address your network's evolving security needs, what kind of approach might be worth considering in its place? The most desirable characteristics in such a solution would have to be:

- ✓ **An integrated and holistic view of network security:** Just as the combination of stateful packet inspection and IPS technology enables technologies like DPI, a holistic and integrated view of network security permits all types of threat or traffic information to drive a comprehensive and well-informed information security strategy.
- ✓ **Optimal TCO:** Reducing the number of overall devices and simplifying management lowers both CapEx and OpEx. Furthermore, it also reduces annual maintenance and subscription costs as well as the number of vendor contracts.
- ✓ **Minimal latency impact:** Reducing the number of overall devices also means that data need only be screened, inspected, and filtered once as it passes through a security device. Moreover, such a device can be built around custom processors specifically designed to handle all those tasks as close to wire speeds as technology will allow.
- ✓ **Comprehensive security coverage:** Integration of security functions means that the same holistic view of security that supports maximum security also delivers the best and most thorough protection to networks where such technology is deployed.

In Chapter 3, we take a closer look at unified threat management, the consolidated solution that addresses the shortcomings of legacy approaches to securing the network and delivers integrated, effective security. Increasingly this same consolidation value is extended to simplify the network itself, along with security.

## Chapter 3

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# UTM Brings Order to the Chaos

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### *In This Chapter*

- ▶ Understanding unified threat management
  - ▶ Being flexible and ready for the future
  - ▶ Seeing and maintaining security through a “single pane of glass”
  - ▶ Avoiding a hodgepodge of devices
  - ▶ Realizing that accelerated hardware also accelerates business
  - ▶ Staying abreast of the changing landscape
- .....

**M**any organizations want to find some way out of the expensive, labor-intensive, unsecure, and chaotic mess of traditional firewalls supplemented with multiple stand-alone security technologies. Unified threat management (UTM) is the approach that many organizations have adopted to improve visibility and control of their network security while lowering complexity of their networks.

In this chapter, we begin by defining UTM. Then, we explore how UTM addresses the various issues and deficiencies of legacy security systems described in earlier chapters, to bring some order to this chaos — as the chapter title says — as well as improve security and manageability!

## *Stepping Up to UTM*

UTM represents a significant shift in the evolution of network security technology and equipment. UTM generally refers to a security appliance that consolidates a wide range of essential



network security, access, and connectivity functions into a single, centrally managed device.

As we write this, the best UTM solutions for networks include the following core security functions in their arsenals:

- ✓ Network firewalls perform stateful packet inspection.
- ✓ IPS detects and blocks intrusions and certain attacks.
- ✓ Application control provides visibility and control of application behavior and content.
- ✓ VPN enables secure remote access to networks.
- ✓ Web filtering halts access to malicious, inappropriate, or questionable websites and online content.
- ✓ IPv6 support in all network security functions protects networks as they migrate from IPv4 to IPv6.
- ✓ Support for virtualized environments, both virtual domains and virtual appliances.

They also include additional security and networking technologies that organizations can choose to deploy, including the following:

- ✓ Data loss prevention that blocks accidental or intentional loss of confidential, proprietary, or regulated data.
- ✓ Antimalware/antispam protection that prevents malicious payloads or unwanted messages from entering networks.
- ✓ Endpoint control that enforces corporate security policies with remote users and devices.
- ✓ Sandboxing technology, including cloud-based sandboxing, that provides an additional layer of malware protection by executing suspicious files within a virtual environment.
- ✓ Integrated wireless LAN (WLAN) controller (and often an access point as well) that consolidates all wireless traffic through a single device, which simplifies policy creation and enforcement while reducing network complexity.
- ✓ Integrated wired switch ports that provide extra connectivity in a single device, which simplifies policy creation and enforcement while reducing network complexity.



- ✓ Integrated wide area network (WAN) optimization that speeds traffic and minimizes bandwidth through the use of compression, de-duplication and more. This can be handled as a software function rather than with dedicated hardware appliances to further reduce complexity.

There's much more to modern UTM appliances than a laundry list of functions, however, as you'll see throughout the rest of this chapter (and the remainder of this book).

## *UTM: Flexible and Future-Ready*

UTM delivers a flexible, future-ready, powerful solution to meet the challenges of today's networking environments. Not every organization is going to deploy every technology included in a UTM device; in fact, most do not. A UTM gives an organization the ability to deploy as many or as few technologies as it needs, when and where it needs them. The best UTM solutions employ a simple licensing model that includes all technologies, eliminating the need to purchase additional modules or to count users as an organization's security requirements change over time.

The most advanced UTM devices may be described as:

- ✓ **Flexible:** UTM devices are able to deploy multiple technologies to meet the unique and changing needs of modern organizations and an evolving threat landscape. Real-time updates ensure the technologies, policies, and other security measures are always current. And, with all the technology shipping with the device, adding additional features is just a few mouse clicks away.
- ✓ **Future-ready:** UTM devices are designed around versatile technologies that will remain valuable years into the future. These devices are ready to embrace changes to functionality and the networking environment while maintaining their performance. For example, support for 802.11ac WAVE 2, Power over Ethernet (PoE), and IPv6 today means that customers won't have to perform a "forklift upgrade" of their security infrastructure in the future.

✓ **Powerful:** UTM devices must keep pace with ever-increasing network performance requirements, to ensure that they don't become network bottlenecks.



UTM devices also provide better awareness and control into security issues and potential problems related to network traffic, user behavior, and application content. This increased ability to see security threats lets UTM devices support much more sophisticated detection and prevention technologies than traditional firewalls can support.

## *Integration beneath a “Single Pane of Glass”*

One significant advantage UTM devices have over legacy firewalls combined with multiple appliances is integrated management. With legacy systems, each component in the mix (firewall, VPN, application control, IPS, web filtering, and so forth) has its own management console. Operators need to keep multiple screens open and active so they must jump from one console to the next to see all aspects of their network security. This makes the job of trying to “connect the dots” and understanding the meaning of diverse events even more difficult.

On the networking side, each piece of network gear may come from a different vendor. Console proliferation increases and the administrator needs to learn additional styles of management. Dealing with devices from different vendors also makes it challenging to ensure that the right security policies are established over the right wired and wireless traffic.

The “single pane of glass” management console, by contrast, refers to one coherent and consolidated management interface that provides ready access to all configurations, management, and monitoring functions. Instead of separate consoles, however, this approach presents one consolidated high-level dashboard for all security functions. It also gives operators the ability to drill down into whatever level of detail makes sense for individual functions (or collections of functions) under their control. And it provides the capability to apply security policies at the port or access point level, all with a uniform administrative experience, making life simpler for the overworked staff member.



When security management is segregated, three types of failures may occur as a result:

- ✓ Failure to notice an incident or event
- ✓ Failure to act or respond in a timely fashion
- ✓ Failure to maintain compliance and audit controls

These three failures are far less likely when consolidating management into a single console. In addition to avoiding such critical failures, organizations receive additional benefits, which are covered in the sections that follow next.

## *Cost-effectiveness*

When a company consolidates network and security management, one of the earliest, most tangible differences is a smaller number of devices to manage, maintain, and replace. At the same time, staff previously responsible for now-obsolete equipment become available to perform other tasks and activities.

## *Improved awareness*

Legacy equipment catches only what it can identify and measure. Taking this shortcoming one step further — legacy equipment is also unaware of today's sophisticated advanced persistent threats (APTs) and polymorphic attacks:

- ✓ *APTs* (also known as *multi-vector attacks*) use multiple techniques to entice and attack victims. These techniques can include spam emails, spoofed emails targeting specific users, fake pop-up alerts, social media blog and forum spamming, botnet infection and propagation, poisoned search engine results, compromised banner ads and site content, and so forth.
- ✓ *Polymorphic attacks* are those in which malicious code changes regularly (such as ransomware) to evade detection by traditional signature-based techniques.

For example, in some organizations the perimeter security mail systems, IPS, and web filtering systems are managed independently. As a consequence of an APT attack, each of

the administrators or views in those respective areas may witness and act upon suspicious content or behavior (such as links to phishing sites, incoming malware files, spoofed email messages, and an internal system trying to communicate with an external site). It could be a long time, if ever, before the IT staff combines the alerts from the individual systems and then draws the obvious conclusion, which is — a successful attack has occurred!

However, with constantly updated UTM across these areas, such strange behavior isn't witnessed separately but gets correlated within a single console. Only when this kind of information is correlated does the IT staff understand the threat — for example, from an APT attack with interrelated behaviors.

## ***Beware Frankenstein's Monster!***

You know the story of Frankenstein's monster, built by Dr. Frankenstein and made of parts from several different bodies. One hand came from one body, the torso and legs came from another, and they were then all stitched together.



Many organizations take a similar approach to their network security. One appliance comes from one vendor, other devices from another, and so on, and like Frankenstein's monster, they all get stitched together. By the time all security needs are covered, it's a safe bet that there are more devices than necessary. Besides consuming more space, power, and cooling, extra devices also lead to additional service and support costs.

## ***Accelerated Processing Speeds Business***

When functionality is integrated with a UTM device, individual components operate as parts of a single system. Those components are aware of each other and benefit from each other mutually. For example, processing required by many layers of protection occurs once, instead of repeated for each one. The result of this integrated filtering is to reduce the amount

of processing time and resources required to fully inspect the data, which accelerates the data as it travels through the UTM device.

In Chapter 4, we explore in more detail the performance advantages that UTM devices offer over other network security solutions.

A single network platform that performs many related functions for both security and access is an excellent candidate for hardware- and software-performance optimization. Without a doubt, use of purpose-built, high-speed custom processors called ASICs enables integrated UTM devices to outperform traditional firewalls and stand-alone appliances at the hardware level. (See Chapter 4 for a more detailed description of ASICs.)

But what may be less obvious is that consolidating multiple functions on UTM devices permits its software to be optimized for overall performance as well. That's because designers know what kinds of data are being accessed — and how that data flows — and take advantage of shared processing, storage, and input/output activity. A single vantage point provides more opportunities for optimization than the fragmented, single-function-at-a-time viewpoint that applies to legacy firewalls with add-on appliances.



The ability of optimized software to take advantage of custom hardware in an integrated UTM device enables traffic to flow more quickly through the network. This accelerates the delivery of the data, improves the performance of the systems that utilize that data, and enables more work to get done. Ultimately, this flows directly to the bottom line, so that what is good for the network is also good for the organization as a whole!

## *Keeping Up with the Changing Threat Landscape*

Another critical component of any network security strategy is the ability of the security technology to stay abreast of changes to the threat landscape. These changes can be in the

form of a new variation to an existing threat, or the arrival of an exploit that targets a previously unpublished or unknown vulnerability.

Regardless of what type of new threat is involved, the rules, definitions, signatures, and configuration of the various devices that make up an organization's security infrastructure must change quickly before damage can occur. The source for the knowledge used to make these updates comes from extensive threat research. Today, state-of-the-art threat research requires sophisticated knowledge of a wide range of vulnerabilities, exploits, and threats.

To keep current with the latest threat research tools and techniques, an organization would have to invest substantial resources. This would mean creating a sizeable in-house team and systems to gather and synthesize large volumes of data on a global basis, and then using that information to determine the necessary configuration changes. This is the only way to detect emerging threats and then quickly update the rules, policies, and signatures for any affected systems or devices. That's a very tall order.



For most organizations, creating an in-house security research team is too cost prohibitive. Fortunately, the alternative to a do-it-yourself approach is simple: Purchase a UTM product backed by an extensive global threat research team, deployed around the world to keep up with the evolving threat landscape. A large dedicated team will ensure that products they support are up to date, deploying the latest protection. Paying for security service is better and cheaper than building and maintaining your own in-house capability.

In Chapter 4, we take a look at the underlying technology that enables UTM to deliver the benefits described in this chapter. You also get to see it in action.

## Chapter 4

# A Closer Look at Unified Threat Management

### *In This Chapter*

- ▶ Comparing flow-based and proxy inspection
- ▶ Examining general-purpose processors and ASICs

**U**TM is a broad-based network security platform that represents the next stage of evolution for traditional firewalls. A variety of hardware and software elements protect networks, including firewalls, IPSs, application control, web filtering, antimalware and antispyware software, and more. UTM delivers all these forms of protection on a single, integrated platform.

UTM is administered from a single interface as a collective system. This saves network administrators and engineers from installing, configuring, and maintaining multiple security devices, and from trying to make dissimilar platforms all work in unison to protect their network infrastructure. Because all protective functionality resides within one device and management interface, all of its protective methods are integrated and better able to provide “unified” coverage. Also, a single UTM device saves room in the server rack, utilizes less power, and generates less heat because it can be deployed with a single device that occupies fewer slots.

In this chapter, we explore some of the technologies in more detail and discuss the profound benefits of UTM.

# Choosing the Right Inspection Technology for Your Network

UTM devices examine traffic to determine whether that traffic violates any policies. They can employ multiple inspection methods to address many different types of threats. Each inspection method has its own characteristics, advantages, and disadvantages.

## Flow-based inspection

*Flow-based inspection*, also called stream-based inspection, samples the data entering a UTM device and uses pattern matching to determine whether there is malicious content. It doesn't fully reassemble files like proxy-based inspection, which we discuss in just a bit.



Flow-based inspection analyzes the data in chunks rather than fully reconstructing all elements of the communication, including files. This dramatically reduces the amount of data a UTM device needs to analyze.

## Benefits of flow-based inspection

Speed is the chief advantage of flow-based inspection. Because there is less inspection of the data and less processing of the data, flow-based inspection is faster than proxy-based. Unfortunately, flow-based inspection methods are less complete than the proxy-based approach, meaning that some malicious content may be missed.



The advantages of flow-based inspection are also its disadvantages. Although ignoring specific content increases speed, any data carried by packets within a flow remains unexamined. Depending on the type of intrusion or attack, flow detection methods can miss certain exploits.

## Proxy-based inspection

*Proxy-based inspection* reconstructs content entering the UTM device and performs a full inspection of the content, looking



for possible security threats. It doesn't sample the data like flow-based inspection; instead, it inspects the full contents of a communication session, such as its files.

The UTM device acts as a proxy in the security inspection chain. The device downloads the payload of a content protocol session, reconstructs it, and then inspects the content. If the content appears clean, then the device sends the content to the client. If a virus or other security problem is detected, the device removes the problematic content before sending the file (or web page or what have you) to the client.

## ***Benefits of proxy-based inspection***

The major advantage of proxy-based inspection over flow-based inspection is the level of security provided. Proxy-based inspection takes a more detailed look at content, making the proxy approach more thorough. It catches more malicious content and threats than the flow-based method.

On the other hand, the deep inspection of the proxy approach requires more processing power, which can lower network throughput and increase latency.



Proxy-based inspection provides a high level of security and offers enhanced protocol awareness, but at a cost of latency and lower throughput in high-speed environments.

## ***General-Purpose Processors versus ASICs***

All tasks performed by firewall and UTM devices involve software running on hardware. In the preceding section, we examine the differences among different methods of network traffic inspection, including their pros and cons. Software manages all those inspection tasks, but the tasks have to run on hardware platforms. Thus, the processors used to power the software make a difference.



General-purpose processors are designed to work in a wide variety of computer hardware environments and to process a wide variety of instructions. Think of a general processor as a one-size-fits-all, not purpose-built chip intended to deliver a wide range of services.

By contrast, application-specific integrated circuit (ASIC) processors are designed to run instructions for a very specific application or narrow range of functions. ASIC chips are created to deliver specific functions, and in UTM devices, deliver accelerated processing of security functions.

## ***Benefits of general-purpose processors***

The main advantage of a general-purpose processor is that it's generic. General-purpose processing chips are designed to work in the widest possible range of hardware platforms under varying conditions and to manage many different sorts of software instructions. This type of chip design isn't locked into a specific environment, platform, or instruction set, so it can adapt to different computing and business requirements easily.

General-purpose processors do caching very well, which is important in platforms such as firewalls that require fast parsing of application data and speedy lookups in the cache. The flexibility of general-purpose processor architecture is well suited for the diverse requirements of application caching for firewalls.

What works for general-purpose processors also works against them. This processor architecture operates okay with everything but doesn't excel at application-specific tasks. General-purpose processors are equally good and equally poor at what they do. If you need a processor suited to a very specific set of tasks for a particular hardware design, general-purpose processors seldom provide "the best fit."

## ***Benefits of ASIC processors***

The strength of an ASIC chip is in its specialization. An ASIC chip is designed to perform a single set of functions

with optimal efficiency, performance, and scalability. For network security, that means creating ASICs designed solely to perform processing and inspection of data for security purposes. ASICs designed to meet those requirements will outperform generic chips in the same devices. In this case, an ASIC chip is one component in an overall, high-performance hardware platform designed to run network and security-specific software.



The fastest UTM devices on the market utilize a combination of ASIC processors and general-purpose CPUs to deliver very high throughput combined with very low latency.

## ***Tuning ASIC processors for work and packet flows***

Although ASIC chips can be engineered for many tasks, a few are specific to specialized UTM security operations, such as content and network processors. There are also other specialized processors that work with the custom ASICs, offering additional acceleration options.

### ***Content processors***

A *content processor* is designed to make high-speed comparisons of objects contained in network traffic to the characteristics of already known threats. The design of content-specific ASIC processors allows them to examine objects, which can be network packets, compressed files, or other objects in the traffic stream. Content processors can quickly organize and examine these objects for any unusual patterns or variants suggesting a threat. Content processor chips are engineered for protocol recognition and parsing, required to perform these highly specialized examinations.

### ***Network processors***

*Network processors* operate at the interface level to deliver an extremely low-latency data path. These ASICs are engineered for high-speed processing, examining the characteristics of the traffic itself rather than objects contained within the traffic, looking for patterns indicative of threats.



## A UTM by any other name

The traditional compilation of individual network security measures is becoming increasingly inadequate to protect infrastructures from newer threats such as botnets and APTs. Defense efforts must be unified to provide comprehensive protection against continually changing cyberthreats. Because network security infrastructures vary depending on customer size and security requirements, UTM platforms need to be scalable. For example, network security requirements for small and medium-sized businesses (SMBs) will be very different than those for global businesses and organizations.

When considering the term *unified threat management*, no one individual collection of technologies accurately describes the range of options. Which technology is considered a part of a UTM solution? It often

depends on the individual vendor, as the technologies can vary significantly. There is a caveat, however.

There is also some confusion in the market over the difference between UTM and next-generation firewalls (NGFWs). *Next-generation firewalls* are similar to UTM devices in that they are consolidated network security devices and operate as an inline security barrier with network security policy capabilities in real time. The most significant difference is that they provide a subset of the technologies included in most UTM solutions.

Because all UTM devices are not created equal, do your research, shop around, and select the best platform for your organization's specific network security requirements.



One of the key tasks for this kind of processor is to accelerate firewall, intrusion prevention, and application control performance. Network processors, because they operate at the interface level, enable wire-speed performance, independent of packet size, with switchlike low latency for multimedia services, unicast, and multicast traffic. These processors also provide accelerated encryption for IPsec, TCP offload, virtual domain support, QoS, traffic shaping, and management logging.

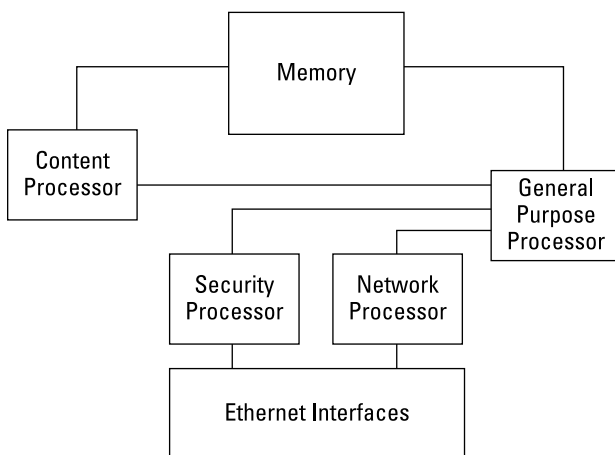
### ***Security processors***

Another class of custom processors exists as well, known as *security processors*. These are a multicore, multithreaded processor combined with content processor logic. They operate

at the interface or system level and add additional packet processing and acceleration options.

### ***General, content, network, and security processor integration***

Up to now, we've looked at the differences between general-purpose and ASIC processors. Within ASIC processors, we've examined differences between content and network processors. In UTM systems, different chip types may be integrated into an overall architecture for optimal handling of different threats. In Figure 4-1, you see a high-level architecture for a UTM device that employs all of these processor designs.



**Figure 4-1:** High-level diagram of a UTM platform using onboard content, general, security, and network processors.

Network traffic enters the UTM through Ethernet interfaces and is immediately sent to the network and security processors for analysis. Traffic is then passed or blocked based on the results of that inspection, and passed traffic moves to the general processor unit. The general processor sends any traffic that contains objects requiring content examination to a content processor, which compares the object to prior threats.

As you can see in Figure 4-1, network and security processors filter all network traffic entering the UTM. In addition to performing threat analysis, this design also takes on such

tasks as general TCP processing, network address translation (NAT), and encryption/decryption. By comparison, a content processor isn't placed in line with traffic flow and doesn't come into play unless the general processing unit notifies the content unit that some object requires examination, maximizing the efficiency of the inspection process.

In Chapter 5, we look at how the various technologies in UTM work together to provide comprehensive network security. We also provide several customer examples.

## Chapter 5

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# Unified Threat Management in Action

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### *In This Chapter*

- ▶ Getting an overview of essential technologies
  - ▶ Protecting the network from end to end
  - ▶ Exploring how real-world organizations put UTM to work
- .....

**T**oday's organizations can't be too careful when it comes to network security, access, and connectivity, especially when customer data and regulatory compliance are at risk. Many layers of security are required to keep attackers out and to keep sensitive data from falling into the wrong hands. At the same time, achieving strong security shouldn't come at the expense of overloading busy network staff or affecting application or network performance. Unified threat management (UTM) systems consolidate security technologies into a single, dedicated device with a single management interface.

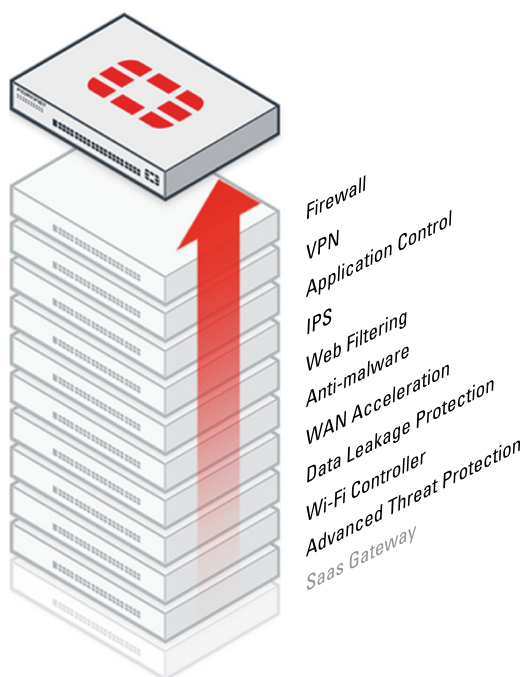
In this chapter, you get a close-up view of UTM in action, starting with an examination of some essential UTM technologies: intrusion prevention, application control, web filtering, data loss prevention, antispam, and antimalware.

You also find out how UTM truly protects a network from its perimeter to the core, and you learn some key implementation tips. Finally, you're presented with brief case studies of three organizations that chose a UTM solution, and how such a transition improved business and customer service.

## *Parts That Make the Whole: Essential UTM Components*

A UTM system is more than just a security box sitting on your network. It includes multiple functions, from application control to web filtering and more, all centrally managed and working in concert.

In the following sections, we look at core UTM technologies you can deploy to protect your network from today's threats. See Figure 5-1.



**Figure 5-1:** A look at today's UTM technologies.

### *Application control*

*Application control*, an important next-generation firewall feature, gives you visibility into applications that generate



traffic on your network, along with the ability to control those applications.



Application control can identify and control applications, software programs, network services, and protocols. In order to protect networks against the latest web-based threats, application control should be able to detect and control Web 2.0 apps like YouTube, Facebook, and Twitter. Enterprise-class app control provides granular policy control, letting you allow or block apps based on vendor, app behavior, and type of technology. For example, you can block specific sites, block only your users' ability to follow links or download files from sites, or block games but allow chat.

Another feature of application control is the ability to enforce identity-based policies on users. The UTM system tracks user names, IP addresses, and user groups. When a user logs on and tries to access network resources, UTM applies a firewall policy based on the requested application or destination. Access is allowed only if the user belongs to one of the permitted user groups.

*Traffic shaping*, a method of guaranteeing network bandwidth to certain types of traffic, gives priority to some apps while limiting bandwidth for others. Application control provides traffic shaping, which is handy for keeping bandwidth-hungry apps, such as Skype, iTunes, or YouTube, in check.



Application control also extends to network endpoints, from workstations to smartphones. Using an application control list on a security gateway, applications are allowed, monitored, or blocked at the gateway and at the endpoint.

## ***Intrusion prevention systems (IPS)***

An *IPS* protects your internal network from attacks that originate outside the network perimeter, as well as threats from within. IPS is also considered an important component of a next-generation firewall. The IPS component in a UTM

solution offers a wide range of tools to detect and block malicious activity, such as:

- ✓ **Predefined signatures:** A database of attack signatures, such as those used against unpatched operating systems, is updated regularly.
- ✓ **Custom signature entries:** These entries pick up where standard IPS signatures may not provide complete protection, mainly against new or unknown attacks.
- ✓ **Packet logging:** This type of logging enables you to save network packets that match certain IPS signatures and analyze the log files with analysis tools.

## Web filtering

*Web filtering* lets you control what kinds of web content a user may view. By using web filtering, you can greatly reduce your exposure to spyware, phishing, pharming, inappropriate sites, website redirection, and other threats lurking on the Internet.

The web filter feature scans the content for every web page that's accepted by a firewall policy. Content filters allow you to create a *blacklist* of banned words and phrases, and URL blocking lets you block unauthorized website addresses. Category blocking is a third method of filtering web content, which relies on URL ratings to allow access to "good" sites and block access to "bad" sites.



Vendors understand the challenge of today's security managers and administrators, so many vendors provide URL blacklists with their products to expedite this technology.

## Antispam

*Spam filtering* can block threats like viruses and bots, which arrive in your users' email boxes. Multiple antispam technologies incorporated into UTM can detect threats through a variety of techniques, including:

- ✓ Blocking known spammer IP addresses to prevent receipt of email from those addresses.
- ✓ Blocking messages where any URL in the message body can be associated with known spam.

- ✓ Creating a message hash, then comparing that value to hashes for known spam messages. Those that match may be blocked without knowing anything about their content.
- ✓ Comparing the IP address of the client and email address of the sender to those on a blacklist/whitelist specified in a protection profile. Those on the whitelist get through; those on the blacklist are blocked.
- ✓ Conducting DNS lookup for the domain name when starting an SMTP session to see whether the domain exists or is blacklisted.
- ✓ Blocking email messages based on matching message content with the words or patterns in a selected spam filter banned-word list.

## Data loss/leakage prevention

*Data loss prevention (DLP)*, also referred to as data leakage protection, helps prevent intentional or unintentional transfer of information to someone outside an organization. It can also apply to data that should remain within a department of an organization, such as personnel files or accounting data.



UTM DLP enables you to control data via inbound and outbound filtering, fingerprinting, and more. DLP filtering scans inbound and outbound files, looking for text strings and patterns, and then allows, blocks, or archives content based on matches with the DLP database. With fingerprinting, each document file is assigned a unique fingerprint. Based on the fingerprint, DLP prevents sensitive documents from being shared beyond the network.

## Antimalware

*Antimalware technology* provides multilayered protection against viruses, spyware, and other types of malware attacks. It enables you to scan email for viruses, but it doesn't stop there. You can also apply antimalware protection to file transfer protocol (FTP) traffic, instant messaging (IM), and web content at the network perimeter. Some solutions support secure sockets layer (SSL) content scanning, which means that you can protect the secure counterparts to those types of traffic as well, such as HTTPS, SFTP, POP3S, and so on.

Need help sorting out the alphabet soup? HTTPS is short for *Hypertext Transfer Protocol Secure*, SFTP means *Secure FTP*, and POP3S stands for *Post Office Protocol 3 over Secure Sockets Layer*.

Essentially, a UTM malware filter examines all files against a database of known signatures and file patterns for infection. If no infection is detected, the file is sent to the recipient. If an infection is detected, the UTM solution deletes or quarantines the infected file and notifies the user.

## ***Sandboxing***

*Sandboxing* refers to the process of executing a file in a secure, virtual environment in order to examine its runtime activity at the end-user device rather than its static attributes when in transit across the network. Such virtual environments are instrumented to behave like a live end-user system and tailored to reflect the devices on your specific network. Within such environments, not only is the initial file analyzed, but also its communications and subsequent downloads.

The analysis is an automated process based on sophisticated rules built up over time for the purpose of separating the legitimate from the illegitimate. It ideally includes fine-grained ratings of risk or severity.

Essentially, the sandbox takes the intelligence of malware analysis traditionally found in threat research labs of security vendors as applied to honeypots, customer sample submissions, and other collection methods and packages it up for use in an organization's own environment.

## ***Securing the Network End to End***

Organizations need to secure their networks from the perimeter to the core. We discuss UTM features such as application control and web filtering earlier in this chapter. In this section, we address technologies that add more muscle to a UTM strategy all the way to the end-user level: integrated wireless LANs, endpoint control, and secure remote access.

## *Deploying integrated wireless LANs*

Using separate LAN and wireless LAN (WLAN) security systems makes consistent policy enforcement tricky and causes potential blind spots. To control all traffic, both wired and wireless, you need a single set of policies.

A Wi-Fi controller lets you integrate wireless networks into your current network infrastructure. Each Wi-Fi network or service set identifier (SSID) is represented by a virtual network interface. By using an integrated WLAN controller in your UTM appliance, you can impose the same security policies and controls on the wireless network as you do on a wired environment, eliminating potential blind spots. This approach also simplifies the detection and suppression of rogue wireless access points, helping you to prevent unauthorized access of your network.



An integrated WLAN also simplifies compliance for regulatory requirements, like those included in the Payment Card Industry Data Security Standard (PCI DSS). This is particularly important in modern retail stores, where Wi-Fi is increasingly being deployed for customers to access.

## *Segmentation: Built-in Ethernet switching*

With network perimeters becoming more porous and prone to breaches, adding new layers of protection to the flat and open internal network is becoming an industry best practice.

The inclusion of an integrated Ethernet switch (featuring a high density of ports) within a UTM solution enables segmentation — essentially the capability to compartmentalize different parts of the internal network to provide added layers of separation and security for sensitive data, intellectual property, or critical infrastructure.



Because today's advanced attacks are increasingly adept at getting past perimeter firewalls, anticipating the potential for a breach isn't just an issue of risk mitigation and loss prevention, but also one of meeting current and emerging regulatory compliance requirements.

## *Protecting information in transit: IPsec and SSL VPNs*

VPN technology allows you to encrypt traffic as it moves across the Internet from remote devices to corporate access points, preventing anyone who might intercept it from viewing its contents. There are two types of VPNs: IPsec and secure sockets layer (SSL).

SSL-based VPNs allow connectivity from almost any Internet-enabled location using a web browser and its native SSL encryption. IPsec-based VPNs differ from SSL VPNs in how an encrypted tunnel is formed. However, like client-based SSL VPNs, IPsec VPN connections are established using preinstalled VPN client software on the user desktop. IPsec VPNs are also used for site-to-site connectivity where remote branch offices are connected over the Internet.



If you support a variety of remote users, consider deploying both SSL and IPsec technologies. For example, you could place an IPsec client on those systems under your control and use clientless SSL-based connections for those systems you don't control.

Encryption alone doesn't offer complete protection. Just because an outsider can't decipher encrypted data as it passes over the Internet, it doesn't mean such information is "safe." Without other protection, malware and legitimate traffic can traverse a "secure" VPN tunnel.

## *Just like being in the office: WAN optimization*

Users accessing a network from a variety of locations expect their "office" environment to exist wherever they happen to be. This can be a problem because Internet speeds are often inadequate for data-intensive applications, or because of the cost of high-speed links. In such situations, WAN optimization plays a critical role using various techniques to improve WAN performance. These include protocol optimization, byte caching, web caching, SSL offloading, and secure tunneling to deliver improved application and network performance to make remote workers more efficient.

## Are you really who you say you are?

Authenticating users before they access your network is vital. Unfortunately, in many situations, simple usernames and passwords don't cut it. Organizations often require stronger authentication for groups of users who have access to high-value systems (network administrators or the Treasury group in Finance).

*Two-factor authentication* relies on the concept of “something you know” and “something you have” to provide stronger authentication than simple username and password combinations. The “something you know” is the user's own individual

name and password. The “something you have” is typically a token the user possesses — either a small device or an application running on a mobile phone. Upon entering a password, the token provides a one-time password synchronized with an access server at headquarters. That way, any unauthorized individual must possess both the user's individual password and the token itself to gain access.

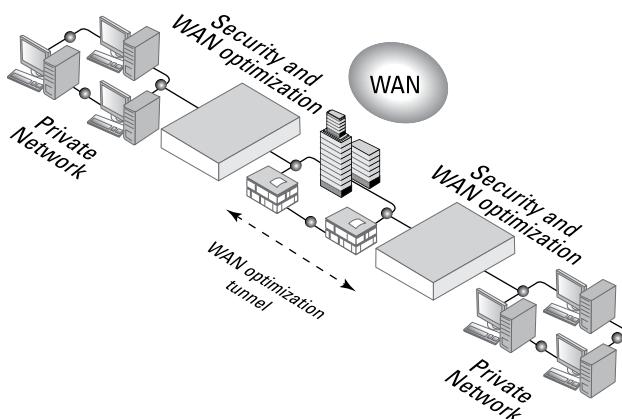
Advanced UTM devices support two-factor authentication, which greatly reduces the risk that unauthorized individuals can access network resources.

Here's more information on these techniques:

- ✓ **Protocol optimization:** Improves the efficiency of traffic that uses FTP, HTTP, TCP, and other protocols, accelerating network performance.
- ✓ **Byte caching:** Caches files and other data to reduce the amount of data transmitted across the WAN.
- ✓ **Web caching:** Stores or caches web pages and then serves them upon request to reduce latency and delays between the WAN and web servers.
- ✓ **SSL offloading:** Offloads SSL decryption and encryption from web servers onto SSL acceleration hardware, accelerating the performance of the web servers.
- ✓ **Secure tunneling:** Secures traffic as it crosses the WAN.



To reduce costs and make management easier, look for a security appliance that also offers WAN optimization features. Then, install the appliance between two private networks and the WAN. For best performance, install two appliances, one on either side of the WAN link, as shown in Figure 5-2. This configuration optimizes all traffic that traverses the WAN.



**Figure 5-2:** WAN optimization units located on both sides of a WAN and in front of both private networks.

## Controlling endpoints

The “office” today no longer applies only to a building that houses employees and cubicles. Employees are increasingly on the move, using laptops, tablets, and smartphones to access corporate data. They need corporate network access, but the mobile nature of the devices they use also presents added security challenges.



To control endpoints, use a remote access connectivity solution that:

- ✓ Incorporates IPsec and SSL VPN technology for secure remote communications
- ✓ Enforces policies on endpoints, such as disabling a file-sharing application or ensuring that an antimalware application is running and up to date
- ✓ Uses web filtering and other UTM technologies to reduce the potential for exposure to malicious web content and sites
- ✓ Uses a security appliance with built-in WAN optimization

Enforcing corporate data policies on all remote user connections helps make these endpoints as secure as possible.



## Use Cases

Now that you understand how UTM works and its benefits, here's a look at how some organizations — from finance to retail to government agencies — have improved their security and productivity by putting UTM to work.

### *Midland Federal Savings & Loan*

Part of Chicago's neighborhood fabric, Midland Federal Savings & Loan offers checking and savings accounts, loans, insurance, and more to local businesses and consumers. More than 100 employees work in its head office and three of its branches in southwest Chicago.

Protecting critical assets like customer banking and insurance information is a core requirement for this bank. A few years ago, Midland took a hard look at its IT infrastructure and security. The weakest point was that the three branches shared an Internet connection with the head office. If that connection went down or was compromised, the entire organization would be affected.

Working with a third-party solution provider, Midland decided to invest in a comprehensive UTM solution. It included VPN access, IPS, perimeter antimalware, antispam and email content filtering, and web filtering.

This solution provided a higher level of protection for customer data. Employee productivity increased, too. Spam filtering, for example, blocked more than 500,000 spam messages per month. Likewise, the web filtering system blocked thousands of unauthorized websites monthly. Not only did this keep employees focused on their work, but it prevented malicious website redirection and reduced legal liability as well.

Because the UTM solution streamlined administration tasks and increased network performance, Midland Federal saw a return on its investment in the first year after implementation.

## *Valvoline Instant Oil Change*

Many folks know about Valvoline Instant Oil Change (VIOC), a quick-lube chain with more than 800 shops in the USA. VIOC is based in Lexington, Kentucky, and is owned by Ashland, Inc.

VIOC's legacy network wasn't cutting it and the company wanted to introduce a wireless LAN. Because VIOC accepts credit cards as payment for services, it must follow the Payment Card Industry Data Security Standard (PCI DSS). This standard includes stringent IT and security requirements.

Each shop required a separate, secure wireless LAN for its point-of-sale system, for wireless handheld scanners used by employees to service customers in the parking lot, and for wireless laptops for manager use. VIOC also wanted to offer free Wi-Fi to customers waiting for oil changes. To release VIOC from liability, management needed a splash page that listed usage rules and required customer consent.

The company deployed an integrated solution at its Kentucky headquarters that included centralized network management, along with VPN and web content filtering, and a backup appliance at an Ohio location for redundancy. Each VIOC shop used wireless access points managed by the UTM appliance to provide wireless infrastructure and secure SSIDs. Web content filtering prevents customers from accessing "inappropriate" sites.

This new solution lets VIOC meet regulatory compliance, while its shops provide better customer service. It also has increased employee efficiency.

## *PSC Info Group*

Headquartered in historic Valley Forge, Pennsylvania, PSC Info Group provides statement printing and mailing, data management, and information management services. It has more than 1,000 clients that include healthcare providers, financial firms, government agencies, and utilities.

PSC handles upwards of one million client documents daily, receiving most of them over the web or via email. Because

many of its clients are in regulated industries, PSC requires tight security to protect client data.

The company had begun to feel some pain regarding security and expansion. For example, because of the web-based nature of file transfers, networks were sometimes overwhelmed with viruses. Also, the company wanted to switch from a site-to-site VPN network to a multiprotocol label switching (MPLS) network.

PSC chose an integrated UTM appliance with antimalware, firewall, and IPS functions. The company installed a few of the appliances at entry points on the network. Because these new appliances did a better job of managing the network, PSC was able to eliminate many of its other security devices from different manufacturers. Consolidation reduced administration time and costs and the rigmarole of dealing with multiple vendors, contracts, and licenses.

Its new UTM appliances were automatically and continually updated and stopped web and email threats from reaching their internal networks. PSC saw a dramatic decrease in the amount of malware they had been receiving: down from more than 5,000 viruses daily to less than 10, a 99.8 percent reduction!



## Chapter 6

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# Ten (Okay, Eleven) Key Questions to Ask When Evaluating UTM Solutions

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### *In This Chapter*

- ▶ Checking performance levels to separate facts from marketing hype
  - ▶ Getting the security features you need today and tomorrow
  - ▶ Seeing how integrated and centralized management features expand IT's reach
  - ▶ Understanding the value of UTM
- 

**U**TM has become the largest segment of the network security market. Research firm IDC expects UTM products will occupy just under 50 percent of the total network security market by 2017. That huge percentage means a lot of your competitors are moving to UTM or have already installed it on their networks. Is it time to adopt UTM?

Because anything related to network security is an important decision, you should research and compare vendor offerings carefully. It's not easy. This chapter covers a number of key questions to ask before making any UTM purchasing decision.

## *How Does the UTM Solution Perform?*

UTM products come in different sizes and “strengths.” Each product is designed to meet certain performance levels — throughput, latency, and so on — based on connection speed.

As smaller networks migrate to technologies of 1 GbE and faster, their security infrastructure has to keep pace even as additional services are enabled. Otherwise, it becomes a bottleneck, slowing down traffic or missing threats because it can’t keep up.

The key to high performance lies in a UTM’s design. Components should be integrated, modular, and carefully orchestrated. Look for a vendor that offers a purpose-built solution, with high-performance hardware matched to specific security software and networking services. A solution should include network-level custom processes, such as firewalling and bandwidth control, as well as content-level custom processes, like web filtering and antimalware protection, for maximum versatility and performance.



Check whether each vendor’s offerings are verified by rigorous third-party certifications. As you narrow your list, read product assessments from third parties like Ixia Labs or NSS Labs for access to objective testing results. You also need to “kick the tires” to find out if a product performs as expected in your environment. Select three or four solutions to test in your shop. There’s no better way to find out what works and what doesn’t before you make a final selection.

## *Which Technologies Are Included?*

One of the main benefits of a UTM solution is integration of multiple security features like firewall, application control, intrusion prevention, VPN, and other elements into a single product. The inclusion of wired and wireless access features also helps to address some of the key problems associated

with growing network complexity. But not every vendor offers the same feature set or the same functionality across all models in its product family.



Assuming that your shop needs well-rounded protection from daily threats bombarding your network, look for a UTM solution that includes the following features:

- ✓ Firewall
- ✓ Application control
- ✓ IPsec and SSL VPN
- ✓ IPS
- ✓ Web filtering
- ✓ Antispam
- ✓ Data loss/leakage protection
- ✓ Antimalware and/or sandboxing
- ✓ IPv6 native support
- ✓ Traffic shaping/bandwidth control/WAN optimization
- ✓ Built-in Ethernet switch/access point
- ✓ Built-in wireless LAN and switch control

Choosing the right mix of security and networking technologies means knowing your needs today and into the future. What core features should you consolidate into a single device to replace a patchwork of other devices from multiple vendors? What new features are you likely to need in the next two to three years? Do you have remote users or branch offices to support over VPNs? Do you want to use a single management console to enforce policies for remote offices and branch offices, as well as the central office? All this makes a difference!



A mature UTM solution should address all elements of IT infrastructure security, including networks, systems, services, applications, and data. Coverage should include everything from the network perimeter to the core, from DMZ web servers to choke points on internal networks, and to data on mobile devices.

## *Which Network Features Are Supported?*

A UTM solution must be able to support a wide variety of network topologies and features — whatever you have in place now or expect to implement over the next few years.



Find out whether the UTM solutions you're researching allow you to monitor network latency and throughput, and automatically correlate it to event and network logging.

Even if it includes some switch ports and an integrated access point, can the solution provider also manage other switching and wireless access points as your needs grow beyond what's in the appliance?

Finally, look for a UTM solution that lets you segment your networks for greater policy control and event isolation.

## *Does UTM Support IPv6 Natively?*

With the exhaustion of IPv4 address space, IPv6 adoption is accelerating. It is essential for your network security solution to deliver the same functionality for IPv6 traffic as for IPv4 traffic to detect and handle threats delivered via IPv6 protocols.

Does your prospective UTM solution handle IPv6 seamlessly? Can it inspect IPv6 traffic or does it simply pass it along untouched? A UTM solution should natively support IPv6 in its firewalls, domain name system (DNS) in transparent mode, and within session initiation protocol (SIP). A good solution should also be able to handle dynamic routing for IPv4 (such as RIP, OSPF, IS-IS, BGP, and multicast protocols) and IPv6 (such as RIPng, OSPFv3, and BGP4+), as well as policy-based routing.



## *Does It Play Well with Virtual Environments?*

If you run a *multitenant* network or multiple networks, ensure that the UTM solution you're considering offers the ability to segment the appliance into separate security domains, also known as virtual domains (VDMs). VDMs let you create separate zones, firewall policies, user authentication, and VPN configurations for separate departments or even separate organizations. This could be a big timesaver for your IT staff and boost the efficiency of your infrastructure.



Many organizations now deploy virtual machines as a way to improve scalability and flexibility in the IT environment. If virtual machines are utilized in your network, make sure that the UTM solution you're considering supports virtual as well as physical appliances.

## *Is the UTM Solution Scalable?*

Are you planning to expand within the next year or two? Organizations change all the time, mainly to meet customer demands or differentiate themselves from competitors. Expansion is often part of that change.

Whatever UTM solution you choose should be flexible. You should be able to use the features you need now and “flip the switch” or add other features or more users down the road. A modular approach doesn't ding performance the way that some all-or-nothing solutions do.

## *Does It Offer High Availability?*

With today's reliance on continuous communications, every organization, of any size, needs to be concerned about availability. A device failure can be devastating to any organization. High availability ensures that your network security is constantly available, even in case of a device failure.



When it comes to ensuring high availability, you can choose between active-active or active-passive architectures. An *active-active architecture* consists of one primary device that receives all communication sessions and load balances them among the primary unit and all of the subordinate units. An *active-passive architecture* consists of a primary device that processes data and one or more subordinate devices. The subordinate devices run in standby mode until needed. Also, look for bypass ports on the device itself to provide “fail open” network availability in the event of a device failure.

For even higher availability, consider adding another Internet connection from a different Internet service provider (ISP) for redundancy.

## What Kind of Management and Reporting Does It Include?

Integrated, centralized management is a must-have for UTM, but it’s been hard to find in many solutions. Administrators must be able to use one interface to “see” the entire network and make configuration changes to policies and profiles. And within that system, policies for one application should be able to manage or affect other policies automatically. For example, web filtering, application control, and IPS profiles should be covered in firewall policies. That way, it’s much easier to push updates from a central console to multiple devices.

On the reporting front, look for a UTM solution that offers a library of templates to generate commonly used reports with just a few mouse clicks. You also want the capability to generate custom reports quickly and easily. To cut down on administration effort and get the most from your purchase, look for a UTM solution that includes the following management features:

- ✓ **Centralized management:** Lets you remotely manage multiple devices at once and tweak policies and profiles across different modules.
- ✓ **Consolidated management:** “Single pane of glass” lets you remotely manage multiple devices at once and tweak policies and profiles across different modules.

- ✓ **Cloud-based management:** Lets you manage across devices and sites without a dedicated management server to stand up and also manage while being available to devices anywhere, anytime.

Of course, the UTM solution's user interface must be web-based for ease of use and universal accessibility.

## *How Does the UTM Solution Stay Ahead of Threats?*

With thousands of variations of malware, malicious sites, and exploits in the wild, today's UTM solution must use a combination of cutting-edge technologies to beat back attacks. Vendors must also continuously send updates to their customers to ensure that customers' devices and networks are fully protected.

UTM vendors enable customers to subscribe to security services and updates to continuously update their systems. However, not all research teams are created equal and not all UTM vendors develop all components themselves. For example, you'll want to pursue the following topics:

- ✓ Which vendors have their own research teams that track emerging threats from around the world and determine how malware works? Relying on third-party updates can slow things down.
- ✓ Do the vendors have research teams in different countries, and do they deal with software and hardware vendors directly?
- ✓ What is each vendor's response time for taking action on newly discovered threats or their variants?
- ✓ How do you measure effectiveness among alternate offerings?



Look for UTM vendors whose services have been independently tested on a regular basis among competitive alternatives. Established test houses include NSS Labs, Virus Bulletin, and AV Comparatives among others.

## *How Much Does It Cost?*

The capital expenditure for any network security solution is a difficult deciding factor for buyers — but it's always a key element in the selection process. Piecing together an ad-hoc security system that includes firewall, VPN, application control, intrusion detection, web filtering, antimalware, and traffic shaping can quickly add up. There are also maintenance fees and subscriptions to consider for antimalware, IPS, and content-filtering updates.

The more demanding your traffic needs, the more you'll have to pay, regardless of the technology. A UTM solution allows you to lower your costs by consolidating multiple systems, thereby lowering your total cost of ownership (TCO). Don't forget to take into account the cost of your IT staff. Because a new UTM solution is more efficient to operate and administer, your staff is free to perform other activities.

### *Simple licensing or not?*

Check whether the UTM vendors require per-user licensing. Not all vendors do. Per-user licensing, or the need to license additional modules, can add more costly line items to your UTM budget. Look for a vendor that offers an unlimited number of users and features without additional licensing.

### *Weighing costs versus benefits*

Be sure that you consider all of the benefits of a UTM solution instead of only the sticker price. Performance, effectiveness, and management are three of the most important factors that can tip the decision from one solution to another.

How much is a solution worth that can virtually eliminate throughput and latency problems, even with a high number of concurrent users? What if you need to expand the system fairly quickly — adding new security or connectivity functions? What is the cost benefit of being able to configure changes to handle growth rather than starting a new round of technology research? How important is centralized and integrated management that frees IT staff to focus on more pressing issues?



Streamlined performance, scaling to meet growth, and effective centralized management can be critical to organizations with lots of users to support.

## *What Support Options Are Available?*

Your organization's IT staff is busy handling a wide variety of equipment and services. They can't know all the details of every piece of hardware or software in their infrastructure. Plus, you have to rely on the vendor for periodic updates to the firmware and software.

For the best shot at a successful UTM implementation, you need a vendor who gives you the support you need, whether it is around-the-clock global technical support or regional workday/workweek support. The vendor should have a superior response rate, qualified personnel, and a reputation for strong customer service.



In addition, your organization may need onsite consulting for migration planning and implementation. Such specialized support often comes with a big price tag. But a vendor's engineers have deep skills in the technologies and software you're preparing to install, which can greatly speed up the entire process. Onsite consultants usually offer insights and tips to customers that extend well beyond the tasks at hand.

## *What about training?*

Find out what training options are available, either directly through a vendor or a third party that's certified on the vendor's products.

Online training is essential for both controlling costs and giving busy professionals the ability to fit training into their schedules, rather than the other way around. This type of training should include high-quality videos and directed materials that come close to a classroom experience.

## ***What are current customers saying?***

Always check vendor references. If time allows, visit several companies that are using different UTM solutions. Find out about the level of administration needed to operate the products, how difficult they are to use, and other concerns that come up while researching products.

Organizations with high-volume environments need experienced vendors with superior networking products. When narrowing down your UTM choices, consider vendors with happy customers across a wide range of businesses, industries, and government agencies.

# Glossary



**active-passive architecture:** Consists of a primary device that processes data and one or more subordinate devices. The subordinate devices run in standby mode until needed.

**advanced persistent threat (APT):** An attack that uses multiple techniques to accomplish its goal of penetrating a network and compromising systems, including spam emails, fake pop-up alerts, and malicious social media content. Also known as a multivector attack.

**blacklist:** A list of banned words and phrases, or forbidden network and Internet sites.

**bot:** Short for robot, an individual computer compromised with malware that takes instructions from a command and control server in a botnet.

**botnets:** A collection of bot computers under the control of a botmaster. A botnet can include hundreds of thousands of bots around the world.

**botmaster:** Also called a bot herder, the person who operates a botnet. A botmaster takes instruction from its criminal clientele to program a botnet to undertake various criminal projects.

**content processor:** A processor designed to make high-speed comparisons of objects contained in network traffic to the characteristics of already known threats. The objects may be network packets, compressed files, or other items in the traffic stream.

**data loss prevention (DLP):** Also referred to as data leakage protection, a technology that helps prevent intentional or unintentional transfer of information to someone outside an organization.

**deep packet inspection (DPI):** Examining the payload or data portion of a network packet as it passes through a firewall or other security device. DPI identifies and classifies network traffic based on signatures in the payload.

**drive-by downloads:** File downloads infected with bots, Trojans, or viruses. Web users are exposed to drive-by downloads by clicking a link that is associated with a malicious website.

**encapsulation:** Wrapping encrypted data inside a protocol envelope for safe transfer over a network or the Internet.

**firewall:** A device that inspects inbound and outbound traffic on a network, allowing safe traffic and denying unsafe traffic.

**flow:** A set of packets that share common properties, such as the same source and the same destination. A flow can be a sequence of packets in a single session, or span multiple concurrent sessions.

**flow-based inspection:** Also called stream-based inspection, analyzes flows entering a UTM device before packets make their way to an internal interface.

**latency:** Delays in the speed of data through a device or network, caused by slow devices or multiple inspection processes.

**malicious mischief:** A common online crime that may include damage or theft for the thrill of it, instead of a profit motive. Malicious mischief stems from political or personal malice.

**multivector attack:** See *advanced persistent threat*.

**network processor:** A processor that operates at the interface level to deliver an extremely low-latency data path.

**packet defragmentation:** Reassembling fragmented packets. Network processors can quickly reassemble fragmented packets and examine them for threat potential.

**polymorphic attack:** An attack in which malicious code changes regularly to evade detection.



**port number:** A numerical identifier, associated with a network address, to categorize network traffic and enforce policies.

**proxy-based inspection:** A UTM technique that reassembles files before performing security inspection.

**proxy server:** Hardware or software that sits transparently on a network and checks all packets for policy compliance before forwarding any of them.

**ransomware:** A type of malware that targets mission-critical systems or applications, locking essential files and disabling recovery/repair features and capabilities. Victims must pay the ransomware developer to “unlock” these files to use the infected system or application.

**security processor:** A multicore, multithreaded processor combined with content processor logic. A security processor operates at the interface level and adds packet processing and acceleration options.

**segmentation:** Dividing an internal network into subnetwork segments in order to improve security.

**spear phishing:** A targeted attack directed at specific employees, customers, or members of a particular organization.

**stand-alone security device:** A specialized security appliance or software. May act as a workaround to the limitations of a traditional firewall.

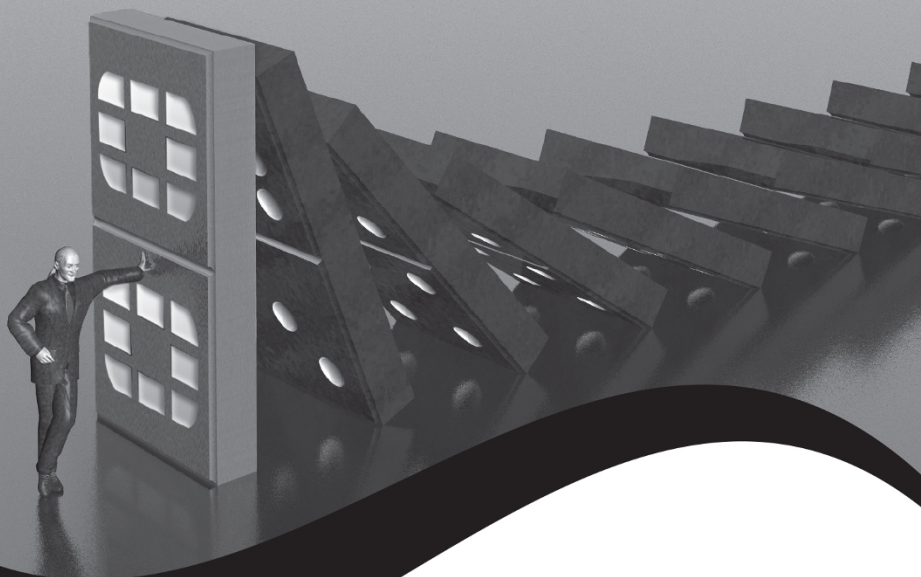
**stateful packet inspection firewall:** A firewall that keeps track of the state of network connections, allowing packets that correspond only to a valid, active connection between a client and server.

**traffic shaping:** A method of guaranteeing network bandwidth to certain types of traffic.

**whitelist:** A list of trusted network or Internet sites.



The threats stop here.



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- **How security consolidation improves performance** — *the benefit of purpose-built hardware and software*
- **What deployment strategies are being used** — *examine case studies to see how UTM works in the real world*
- **How to evaluate new UTM systems** — *what questions should you ask before implementing a new system*

**Ed Tittel** is a freelance writer, consultant, and expert legal witness. A veteran of the technology trade press, Ed has written or contributed to more than 140 books, including *Windows Server 2008 For Dummies*, *HTML, XHTML, and CSS For Dummies, 7th Edition*, and many more.



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