eSoft®

Simply better network security.™

CONTENTS

Evolution of Network Security and Prevention Techniques

Issues with Current Security Solutions

Current Network Security Alternatives

The eSoft Solution

Summary

www.esoft.com

White Paper - Modern Network Security: The Migration to Deep Packet Inspection

Part 1 - Evolution of Network Security and Prevention Techniques

The past few years have seen a radical evolution in the nature and requirements of network security. There are many factors contributing to these changes, the most important of which is the shift in focus from so-called 'network-level' threats, such as connection-oriented intrusions and Denial of Service (DoS) attacks, to dynamic, content-based threats such as Viruses, Worms, Trojans, Spyware and Phishing that can spread quickly and indiscriminately, and require sophisticated levels of intelligence to detect. Where attacks like Smurf, Fraggle and the Ping of Death were the key threats in years past, now attacks such as "Microsoft IIS 5.0 printer ISAPI extension buffer overflow vulnerability" and "Unicode directory traversal" are more prevalent, albeit much less imaginatively named.

There are several major drivers that are shaping the new security landscape:

1 - Increasing complexity of networks

Where a network 10 years ago might have consisted of a LAN connected to the Internet through a WAN connection, and maybe a few remote access or site-to-site VPN tunnels, the reality today is much more complex. A common environment today will have multiple access mechanisms into the network, including 802.11 wireless LAN (with myriad Client devices including portable computers, PDAs and Smart Phones), web portals for partners and customers, FTP servers, email servers, end-users using new communication platforms (such as Instant Messaging) and peer-to-peer applications for file-sharing. An example of such a network, and the threats that are present, is illustrated in Figure 1.

In addition, the workforce is becoming more mobile. From telecommuters who work from a home office to mobile workers who are never in a single location for more than a day, this growing "distributed" model adds a significant amount of risk to the network. To help mitigate these risks, the IT manager must ensure that all remote locations and remote clients are protected with the same level of security as is present in the corporate network.

Finally, threats are just as likely to come from inside the local network as they are from the Internet. One trend alone overshadows all others in this regard; users are taking their laptops home at night and over the weekend, where they are at increased risk of becoming infected or compromised. When the laptops are brought back into the office, the entire network is at risk since the user entered the network "behind the firewall". This is one of many reasons that an emerging "best practice" in secure network design is to segment the network into separate "security zones" (by physical or logical segmentation) such that attacks can be contained in the event of an outbreak.

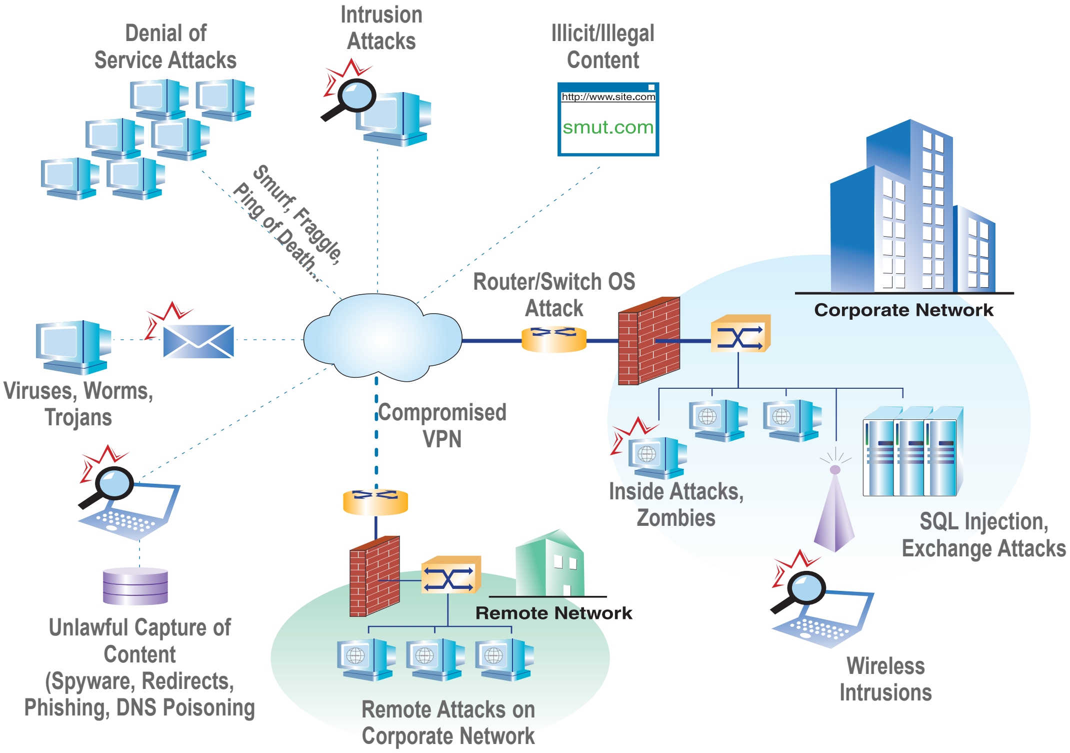


Figure 1 - Prevalent threat vectors in today's networking environment

2 - Increasing sophistication of applications and attacks

Applications are growing in complexity. Where Windows NT launched with 5 million lines of code in 1994, Windows Vista has over 50 million… more than 1,000% growth! With this increased complexity comes increased vulnerability, particularly in server systems, which must be patched on a regular basis.

While applications are becoming more sophisticated, so are the attacks. A "serious" attack in the early 2000's might have consisted of a simple indiscriminate DoS attack aimed at restricting or temporarily disrupting network access. Today's serious attacks target applications themselves, and in many cases have goals of significant criminal intent, as is demonstrated by the Sasser worm described below.

Intrusion Attacks, Worms and Trojans

The "grand-daddy" of them all, the universe of Intrusion attacks is wide and deep. Intrusion attacks are modern threats that target applications and application layer protocols (e.g. using the SMTP protocol to exploit a buffer overflow on an Outlook Exchange server), rather than the networks they are transported on (e.g. DoS attacks that utilize ICMP echo and TCP SYN floods). Examples of common Intrusion attacks are Worms, Trojans, web site cross-scripting, SQL injection and tampering, Outlook Exchange server attacks, Apache/IIS buffer overflow attacks, file-path manipulation etc. The Sasser worm, described below, is a classic illustration of an Intrusion attack carried out by a worm:

A Closer Look: The Sasser Worm

The Sasser worm is a critical malware attack that exploits the Windows LSASS vulnerability; a buffer overrun that allows remote code execution and enables an attacker to gain full control of an affected Client system. To propagate, Sasser scans a network for vulnerable systems. When it finds a vulnerable system, it sends a specially crafted packet to produce a buffer overflow on LSASS.EXE. Sasser then creates a script file called CMD.FTP, which contains instructions for the vulnerable system to download and execute a copy of the malware from a remote infected system using FTP on TCP port 5554. The attacker now has root access to the system, and can infect other systems.

To detect and prevent Sasser, the firewall / network administrator must:

- Be configured to block TCP ports 9996 and 5554
- Detect and prevent the suspect FTP download of the AVSERVE2.EXE file
- Prevent the worm at the network layer by detecting and preventing the NetBIOS buffer overflow
- Remove the Sasser registry entry on the infected machine.

As the Sasser example shows, modern threats are designed to bypass traditional firewalls completely, and instead require an entirely new set of technologies to detect and stop them. An interesting side-note: Sasser also eluded a majority of Anti-Virus scanners, which is one example of why AV alone is no longer sufficient protection for Worms and Trojans.

As discussed later in this paper, the new technology required to protect against modern threats is Deep Packet Inspection (DPI). DPI gives a security appliance the ability to look not only at the packet headers (like a firewall) but at every bit in the packet payload itself, often across multiple thousands of packets, to detect threats.

One of the most significant aspects of DPI is that it is a service-based technology. Unless the security appliance knows what threat signatures or anomalies it is looking for, it is helpless. *The "workhorse" DPI service is typically called Intrusion Prevention Service (IPS).* IPS provides the security appliance with a frequently updated library of threat signatures, heuristic instructions etc., in order to insure it is protecting the network from current threats.

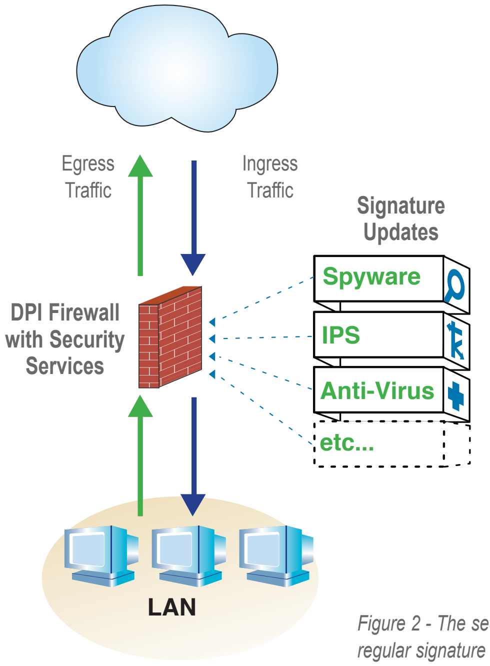


Figure 2 - The security appliance is now a dynamic system that requires regular signature updates

A major impact of IPS (and the other DPI-oriented technologies described below) is that the security appliance is no longer a static element that sits in the network.

The security appliance is now a dynamic threat prevention system that requires constant, real-time updates to its attack signature libraries, URL lists, virus definition files, etc. to ensure the network is protected against threats that are present this hour... as well as those of last week, last month and last year.

Viruses

Viruses (and Worms) are a class of attack whereby an infected attachment or download causes damage to a host system or network. The damage can range from minor (client DoS attack) to catastrophic (full-blown corruption of critical stored information or system registries). A critical trend that is resulting from the increased sophistication of Viruses is the rapidly decreasing "window of infection". In July of 2001, it took the Code Red virus just under 6 hours to infect 359,000 clients. Just eighteen months later, the Slammer worm infected 75,000 clients in under 30 minutes. The threats are real… and spread fast. Security vendors have responded by trying to decrease their own "windows of inoculation"… which is the time it takes to detect a threat, issue a patch release, and download it to its host systems under management.

There is also a new class of virus-related attack called a 'blended threat'. A blended threat is a 'perfect attack' whereby a virus is accompanied by a number of other attack and intrusion techniques to maximize penetration and damage. A good illustration of this type of attack is the SoBig virus detailed below.

SoBig and Sasser are good examples of how complicated it has become to detect and prevent sophisticated application-layer attacks. To protect against these types of attack, it is mandatory to have IPS and Gateway Antivirus (GAV) installed and activated in the network, whether it is provided by a Deep Packet Inspection

Firewall or by a standalone Content Security appliance as described further in this paper. Not only that, but the IPS/GAV systems must be fed with quality, real-time signatures to ensure rapid response to the threats.

A Closer Look: The SoBig virus
SoBig is a mass-mailer virus that sends itself to all email addresses in a user's address books (with the following extensions: wab, dbx, htm, html, eml, txt). The email is supposedly sent by Microsoft support (support@microsoft.com) with non-descript Subject text. When the user opens the email and attachment, code is executed that infects the host computer, then emails itself (using its own SMTP engine) to other unsuspecting computers. The result is a massive bot-net of Zombie machines that self-propagates and amplifies the virus and its damaging effects.

The problem with SoBig was not the malicious nature of the attack itself, but that 1) it consumes massive amounts of bandwidth bringing networks to a crawl, and 2) it opens ports on the infected machine, making it vulnerable to hackers using simple port scans (usually with the goal of planting Trojans).

3 - Financial rewards for hackers with the advent of Spyware and Phishing

The Internet has evolved from being a general information source to a critical enabler of international commerce. Because of the sensitive type of information that now flows freely over the Internet, a new breed of threat aims at obtaining this information… sometimes honestly and sometimes with malicious intent. Because the information obtained in these types of attacks has value, hackers are being financially compensated for their work, often by major public corporations; sometimes by organized crime. This is a particularly disturbing trend, since it is attracting the best and the brightest one-time programmers into the black-hat world of hacking and malware generation.

Spyware

Spyware (and Adware) is one of the most misunderstood of the new generation of application-layer threats because there is no consensus on what defines a threat (or more appropriately, what the difference is between 'annoying' Adware and a true threat). There are three general classes of Spyware:

- Harmless-but-annoying
  Generally consists of actions such as changing the default home page of your browser, or unsolicited/untargeted pop-up ads.

- Information-collecting
  Cookies are the most common type of information collecting mechanism, but simple keystroke and activity loggers are becoming more common. This class of Spyware is generally interested in collecting basic information about you, the sites you visit, and other preferences so that a 3rd party can send you targeted ads or promotions. There is generally not malicious intent, but many would call this an invasion of privacy.

- Malicious
  Full keystroke logging and collecting private information with the intent of sending the information to a collection server. The information is collected, and sold to 3rd parties who have varying interests. Even today, this type of Spyware can be downloaded instantly on a Client device simply by visiting a URL… no further clicking necessary. This type of Spyware is illegal and critical for an organization to detect and stop.

To further add to the complexity, there are three major Spyware delivery mechanisms:

- Embedded Installs
  The most 'honest' of the three mechanisms, embedded installs are typically Spyware/Adware elements that are embedded into programs or services that are downloaded from the web. For example, BigCorp.com might pay a bundling agreement with Claria (Gator eWallet), where they pay Claria $1 per client install.

- Drive-by Installs
  In this method, a banner ad or popup attempts to install software on a PC, usually through the ActiveX controls distributed within Windows and by default enabled in Internet Explorer. Depending on the security settings on the PC browser, the Spyware downloads silently or was downloaded when the user clicked 'Yes' in the installer dialogue box. In many cases, Drive-by's also take advantage of browser exploits that can force an unsuspecting PC browser to automatically download and execute code that installs the Spyware.

- Browser Exploit
  As described above, targets vulnerabilities in the web browser code to install Spyware. A classic example is the Internet Explorer iFrame vulnerability. Because IE is such a targeted browser, many IT departments are migrating to alternate browsers such as Mozilla's Firefox. This is only putting off the inevitable, however, as every browser that gains in popularity will eventually be the target of Spyware attacks.

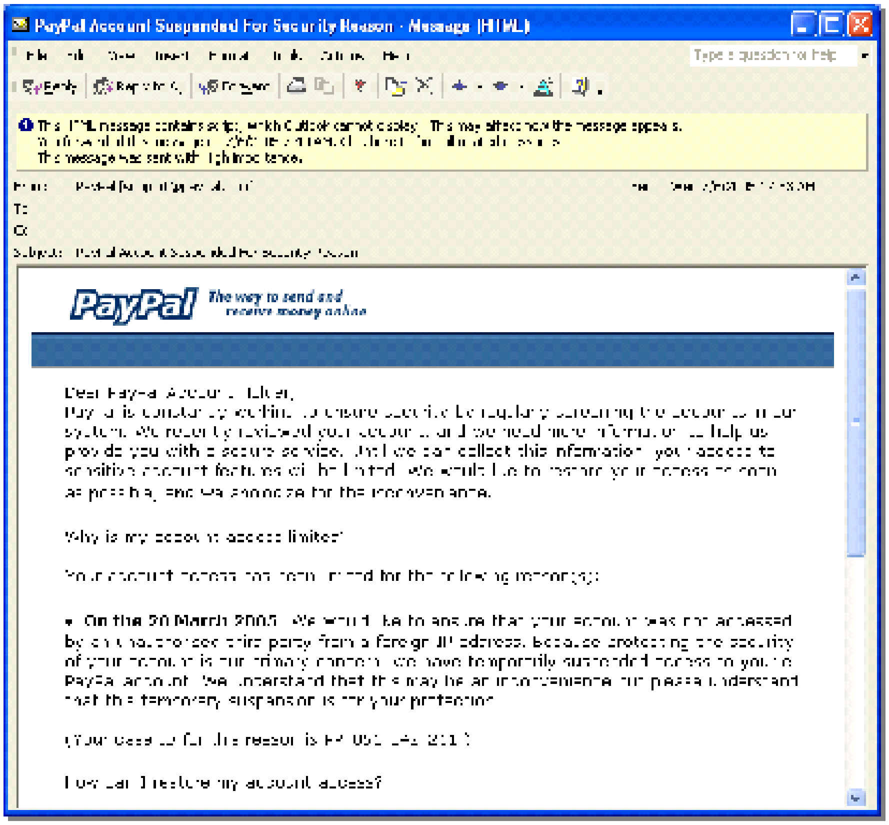
Spyware is difficult to stop because it requires so many technologies to detect and prevent the exploit. A robust Spyware prevention architecture will consist of both client/server and gateway-based elements.

Client and server based Anti-Spyware software will detect and try to prevent users from accessing known bad sites, and to a limited extent provide more advanced functionality to detect suspicious behavior from actual downloads and ActiveX controls. The software will also inspect individual system memory, system registries, start-up files and other stored items to detect and remove Spyware. While necessary, client and server based Anti-Spyware software is not enough.

Since Spyware is carried by so many delivery mechanisms and is getting so sophisticated, an additional gateway-based Anti-Spyware element is required. The gateway element not only reinforces URL filtering to prevent access to known bad sites, but provides thorough IPS functionality that detects abnormal behavior from ActiveX Controls and Java Applets and the like, and also provides Anti-virus functionality that inspects attachments for malicious code that installs Spyware. The gateway is also an effective tool for scanning both Instant Messaging (IM) and peer-to-peer protocols/programs, which are a growing target for Spyware and other attacks. Perhaps most importantly, a gateway-based Anti-Spyware solution mitigates the harmful outbound effects of pre-infected client and server devices (that might be attempting to contact a collection server on the Internet to deliver sensitive personal or company data, for instance).

Phishing and Pharming

By the end of 2006, almost 70% of all malicious e-mail traffic was phishing e-mail. Similar to Spyware, there is financial incentive for Phishing. Phishing comes in many forms, but a common example is a malicious attack where criminal entity sends an 'official' email to an unsuspecting email user, asking that they go to a website and 'validate' their username/password and other account information, as shown in the Figure 3 below.


PayPal Account Suspended For Security Reason - Message (HTML)
File Edit View Insert Format Tools Actions Help
Type a question for help
Reply
Reply to All
Forward
PayPal The way to send and receive money online

This HTML message contains scripts, which Outlook cannot display. This may affect how the message appears.
[illegible]
This message was sent with High importance.

From: [illegible]
To:
Cc:
Subject: PayPal Account Suspended For Security Reason

Dear PayPal Account Holder,
PayPal is constantly working to ensure security by regularly screening the accounts in our system. We recently reviewed your account, and we need more information to help us provide you with a secure service. Until we can collect this information, your access to sensitive account features will be limited. We would like to restore your access as soon as possible, and we apologize for the inconvenience.

Why is my account access limited?

Your account access has been limited for the following reason(s):

- On the 20 March 2005, We would like to ensure that your account was not accessed by an unauthorized third party from a foreign IP address. Because protecting the security of your account is our primary concern, we have temporarily suspended access to your PayPal account. We understand that this may be an inconvenience but please understand that this temporary suspension is for your protection.

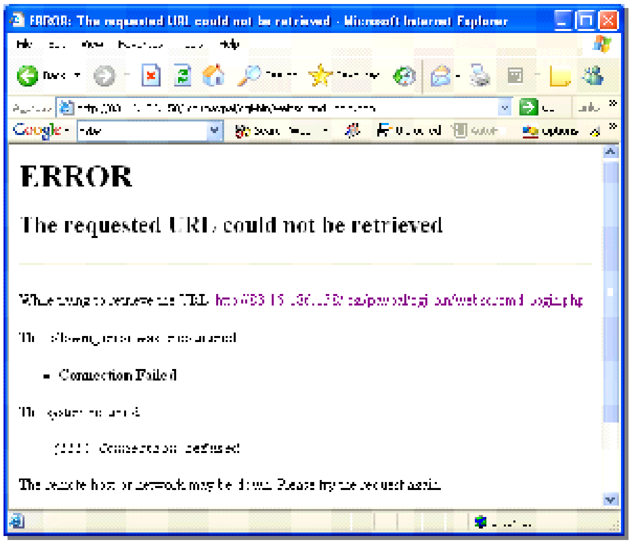
(Your case ID for this reason is PP-051-LA2-211.)

How can I restore my account access?

Figure 3 - Example Phishing email

In this example, a bogus PayPal® email was sent to all users in a corporate network. The email stated that the users PayPal account was suspended because of suspicious account activity from a 'foreign' IP address. The disturbing part of this Phish attack is that the user, upon clicking the link to access their account, is presented with an 'official' PayPal login page with their account login pre-populated, so nothing looks out of the ordinary… convenient in fact. The only thing the user has to do is enter their password, and the scam is complete. In the case of this specific scam, the 'collection' website had already been abandoned by the criminal entity, as shown in Figure 4. Note the sophistication of the refused URL (http://83.16.186.158/.cgi/paypal/cgi-bin/webscrcmd_login.php), which to the casual Internet user looks like it has all of the right address elements to look official, but to an experienced IT manager, there are several red flags.

Phishing scams can get quite sophisticated; it is not unusual for a hacker to re-create an entire web-site in an effort to look legitimate.   Worse yet, there are other Phishing-related threats that are much more serious. With Phishing, an informed user can fairly intelligently determine if what they are being asked to do is normal practice. With a new threat such as Pharming, also called DNS route poisoning,   the DNS servers themselves are compromised, and the DNS entries are modified to point to criminal websites. With a good job of re-creating the target web site, Pharming can be very hard to detect. In a 'nightmare' scenario the user types in their target URL, where the compromised DNS server sends them to an innocuous looking, but malicious website. The user then types in their username and password in the bogus web server, which the criminals collect. Finally, before the user knows anything malicious has happened, they are re-directed to the official web server, where they are already logged in and can access their account as usual. All of this is completely transparent to the end user. While this sounds far-fetched, it is an increasingly regular occurrence.


ERROR: The requested URL could not be retrieved - Microsoft Internet Explorer
Google

ERROR

The requested URL could not be retrieved

While trying to retrieve the URL: [illegible]

The following error was encountered:

- Connection Failed

The system returned:

(111) Connection refused

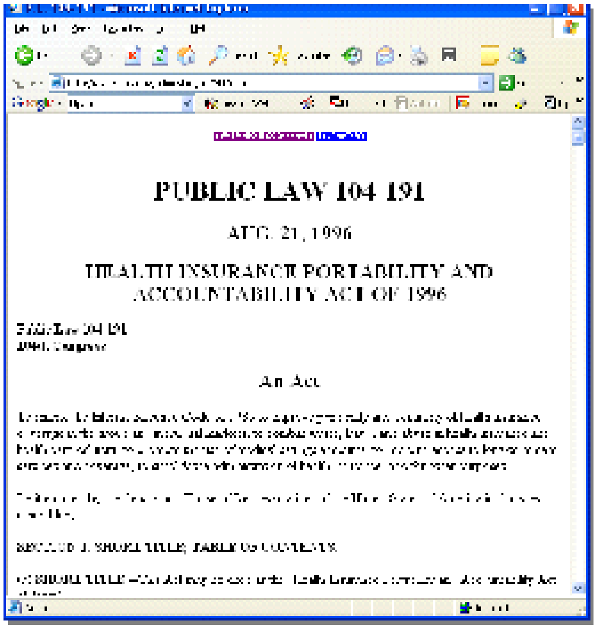
The remote host or network may be down. Please try the request again.

Figure 4 - Abandoned Phishing site

Like Spyware, Phishing is a complicated threat to detect and prevent. The IT administrator's security schema must not only have Spyware software as a mandatory element on the client side, but also at the edge of the network itself on the security gateway. Not only will the gateway prevent Phishing from occurring in the first place, but like Anti-Spyware, it will help mitigate the outbound effects of users who inadvertently accessing something they should not be.

4 - Governmental regulations compliance

Another important trend affecting network security is the growing number of governmental regulations in the US and abroad. One popular example of recent US regulation is the Health Insurance Portability and Accountability Act (HIPAA), which regulates how and when sensitive medical patient data can be transmitted. This regulation mandates that health organizations have Intrusion Prevention and secure connectivity (e.g. VPN) technologies in place to ensure conformance. Another recent US regulation is the Children's Internet Protection Act (CIPA), which aims at protecting minors from pornography, obscenity and other material harmful to minors. CIPA conformance mandates that all publicly accessible Internet connections are protected by URL and Web Content Filtering, which ensures only "proper" sites are accessible from the PC. These are examples of US regulations; almost every nation has, or will soon have, similar regulations in place.



PUBLIC LAW 104 191

AUG. 21, 1996

HEALTH INSURANCE PORTABILITY AND ACCOUNTABILITY ACT OF 1996

Public Law 104-191
104th Congress

An Act

[illegible]

[illegible]

SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

(a) SHORT TITLE.—[illegible]

Figure 5 - Official HIPAA website

Where the government has been lenient on conformance up to this point, they are starting to become much more strict on enforcing and penalizing violators.

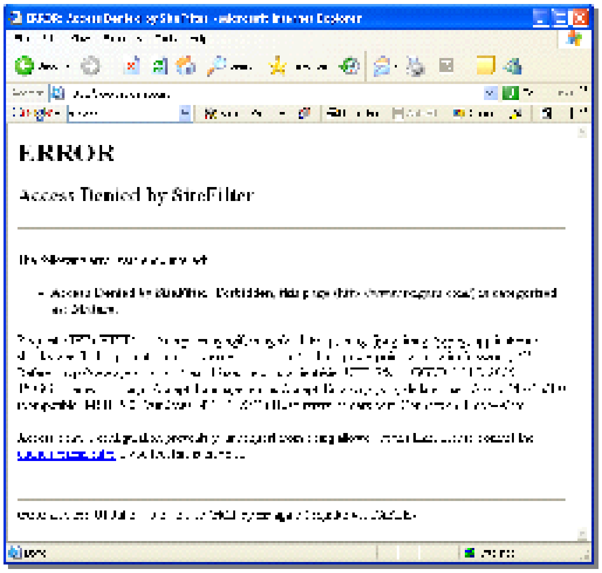
5 - Security as a tool to increase workforce productivity

One of the most profound impacts of security is how it is utilized across all types of organizations to increase operational efficiencies through enhanced workforce productivity. There are two main technologies that are helping achieve this:

Web Security and Policy Enforcement

It is no longer a secret that a good amount of an average employee's day can be spent online doing non-work-related activities. Web surfing, online shopping, online gambling, stock trading and even online dating are a few of the more common uses of company Internet resources.

In what many employees might consider a breach of privacy, the company employing URL filtering technology can monitor and report on individual Internet usage, and can also set scheduled restrictions on what types of sites employees are allowed to access throughout the day. If the company is using this type of technology, eSoft highly recommends that the HR department make public notice that this technology is being used, and also clearly state (in the employee handbook, for example) the rules and restrictions of employee Internet usage. The figure above shows a typical screen an eSoft user will see when they are trying to access a site that was banned by an IT department employing eSoft SiteFilter technology, described later in this document.



ERROR

Access Denied by SiteFilter

[illegible]

- Access Denied by SiteFilter. Forbidden, [illegible]

[illegible]

Figure 6 - Official HIPAA website

URL filtering is also a necessary tool for reducing liability that stems from illegal and unethical use of the Internet in public places or organizations. A classic example of this is where an employee (or Internet café patron, for that matter) is accessing a porn site, and another person walks by, witnesses the activity, and sues the company for emotional distress or a hostile work environment. Libraries and schools, by their very nature, MUST have this type of technology deployed.

In addition to workforce productivity and liability protection, URL Filtering technology is also the first line of defense at preventing users from accessing Spyware sites. As noted in the previous section, however, Spyware is a much more complicated problem than URL filtering alone can handle.

Spam

Spam has grown into a major problem for all companies and organizations. Spam is especially problematic for public email addresses (listed on a website, for instance), or for common email addresses (support@your_company.com). Spam is also the primary delivery mechanism for Phishing attacks, so its importance has grown over the years. In 2006, over 86% of all e-mail was classified as spam. Over 63% of this spam originates from new or unknown sources.

Spam is best dealt with at the security gateway. The reason for this is simple… once Spam emails are inside the network, they are already consuming precious network resources (such as storage, bandwidth and mail server CPU cycles). If prevented before they ever get to a mail server, Spam can become a more manageable nuisance and threat. Another reason Spam is best dealt with at the security gateway is the sophistication of the tools and techniques that are possible to implement at the gateway. Technologies such as word filtering, Bayesian filtering, black and white lists, real-time blackhole lists (RBLs), DNS MX record lookups, reverse DNS lookups, sender policy framework (SFP) compliance and other techniques are all mandatory for effective Spam mitigation. A good gateway Spam filter will reject Spam in such a way that the Spammer will eventually remove the target from their Spam list.

For many technologies such as Bayesian filtering, it is necessary to have many, many samples of known spam, and known ham (non-spam) to begin the heuristic process of self-learning. This is another advantage of Anti-Spam technology at the gateway, where there is visibility into every email coming into or exiting the network.

Part 2 - Issues with Current Security Solutions

Whether dealing with Intrusion attempts through application buffer overflows, Spyware through drive-by installs, Phishing through deceiving emails or any of the other threats described in this paper, there is one capability the security appliance requires above all else: Deep Packet Inspection (DPI) intelligence.

To understand why, it is useful to look at the makeup of a typical Ethernet frame and how a traditional firewall processes it.

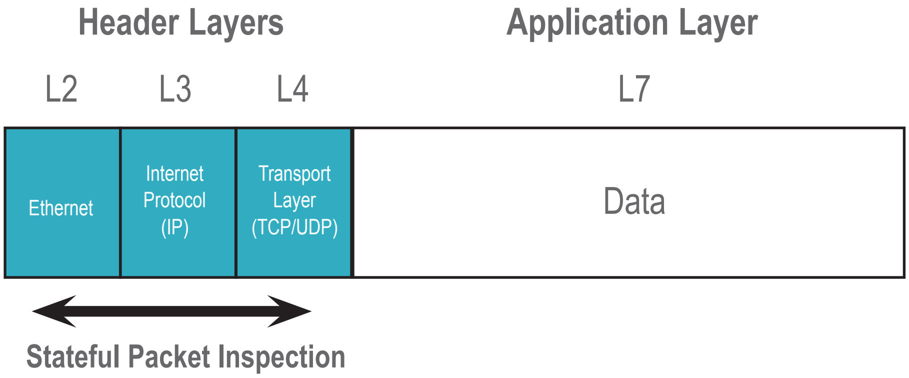


Figure 7 - Ethernet frame and how Stateful Packet Inspection (SPI) views it

As shown in the Ethernet frame above, Stateful Packet Inspection (SPI) essentially has access to Layers 3 and 4 of the OSI stack (sometimes Layer 2, as well). SPI firewalls perform the 'classic 5-tuple lookup'… that is, they scan and make allow/deny decisions based on:

1. Source transport layer address (typically TCP or UDP)
2. Destination transport layer address (typically TCP or UDP)
3. Source IP address
4. Destination IP address
5. Service type (e.g. FTP, HTTP, SMTP, POP3)

What does this really mean? Using a Post Office analogy, the SPI firewall essentially looks at the To and From addresses on a package, as well as the package type (tube, box, letter, etc), and makes a decision about whether to mail the package based on pre-defined rules. Nothing more and nothing less. There is no knowledge of what is inside the package.

SPI firewalls are generally regarded as "network-layer" security devices, as they provide no protection for anything above Layer 4.

The figure below shows the same Ethernet frame, but this time with application-layer information.

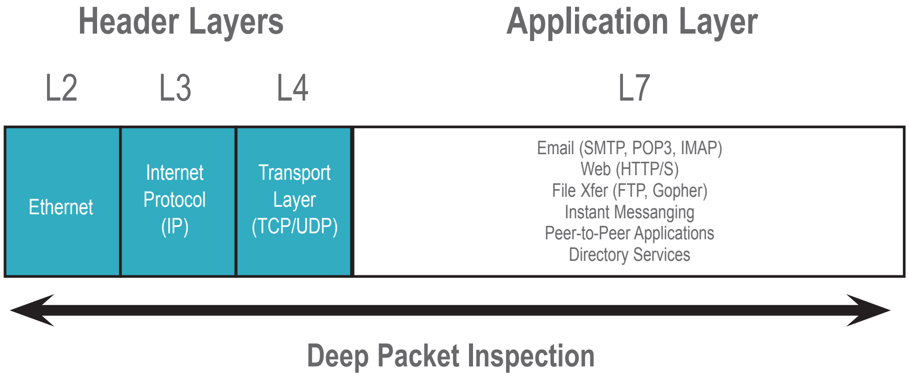


Figure 8 - Ethernet frame and how Deep Packet Inspection (DPI) views it

In addition to the classic 5-tuple lookup, DPI firewalls have "application awareness". Application awareness is a very broad term, but in general it means that the security appliance understands L7 protocols such as HTTP, SMTP, POP3, IMAP and FTP, and also understands the actual applications that rely on those protocols. For instance, Microsoft Outlook Exchange Server relies heavily on the SMTP protocol, Microsoft Explorer and Mozilla Firefox rely on the HTTP protocol, etc. In addition, there are custom protocols for applications such as Instant Messaging, Microsoft SQL Server, Oracle Server, Siebel, etc.

DPI-capable appliances must also have the associated security services that allow them to protect against Spyware, Viruses and other app-layer intrusions. Most vendors, eSoft included, offer these services as optional software modules… purchase the basic security appliance, and add services in an *a la carte* fashion depending on network need.

As stated previously, the basic nature of network security has evolved to a point where the MANDATORY services for any gateway security appliance are Intrusion Prevention and Gateway Antivirus. Without these, the network and its users are only partially protected.

Part 3 - Current Network Security Alternatives

To protect against modern network threats, there are essentially two deployment architectures that are available to the IT manager:

1. Deploy a next-generation DPI firewall that performs traditional SPI firewall functionality, as well as DPI application security, or
2. Deploy a DPI Content Security appliance that sits behind an existing SPI firewall

Both of these approaches are illustrated in the Figure 9 below. In the latter example, the Content Security appliance is typically configured in Transparent mode, where the device sits 'invisibly' between the firewall and the switch such that subnets do not have to be re-mapped. The device examines all traffic in a 'promiscuous' mode, where it makes forward/drop/log/quarantine decisions based on what services are activated (e.g. Anti-Virus, Intrusion Prevention, Anti-Spam, Anti-Spyware, URL Filtering and Spam Filtering).

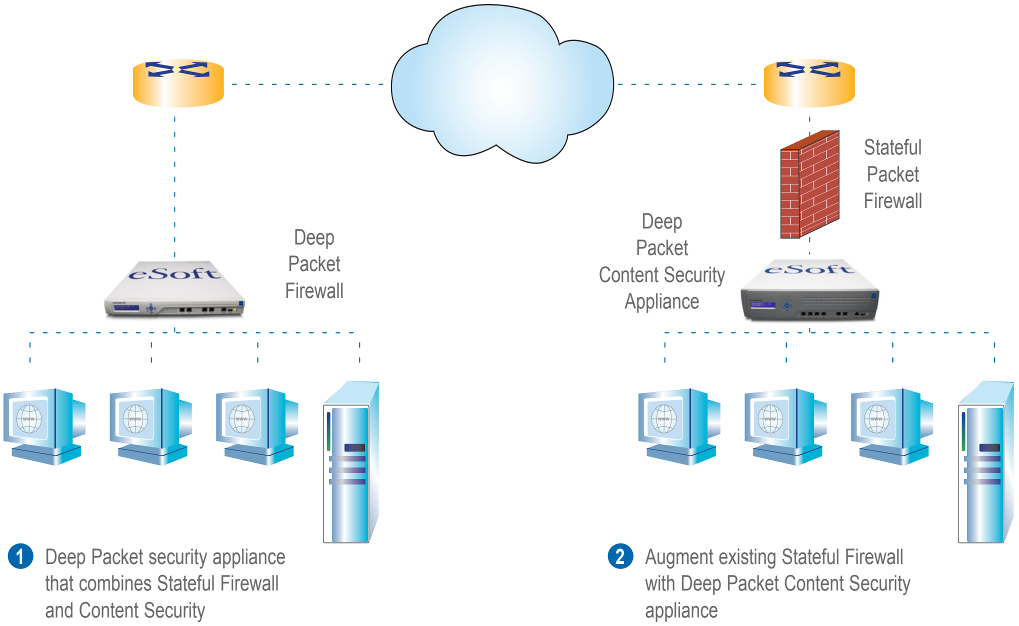

Deep
Packet
Firewall
Stateful
Packet
Firewall
Deep
Packet
Content Security
Appliance
1 Deep Packet security appliance that combines Stateful Firewall and Content Security
2 Augment existing Stateful Firewall with Deep Packet Content Security appliance

Figure 9 - Modern alternatives for Deep Packet security

Part 4 - The eSoft Solution

eSoft offers a complete line of next-generation Deep Packet Inspection security appliances that fit into either deployment scenario described above.

SC MAGAZINE RECOMMENDED

InstaGate Integrated Security Gateway

The InstaGate line Integrated Security Gateways provides state-of-the art Firewall and IPSec VPN functionality, in addition to DPI services such as Anti-Virus, Intrusion Prevention, Anti-Spyware and Anti-Spam. In addition, for the IT manager who wants FULL integration, many of the InstaGate products can be configured with optional office server elements such as Internet server, Email server, Webmail server and File/FTP and Print servers. InstaGate gateways currently integrate more Deep Packet security services than any other vendor on the market.

VPNC CERTIFIED AES Interop

VPNC CERTIFIED Basic Interop

InstaGate 404

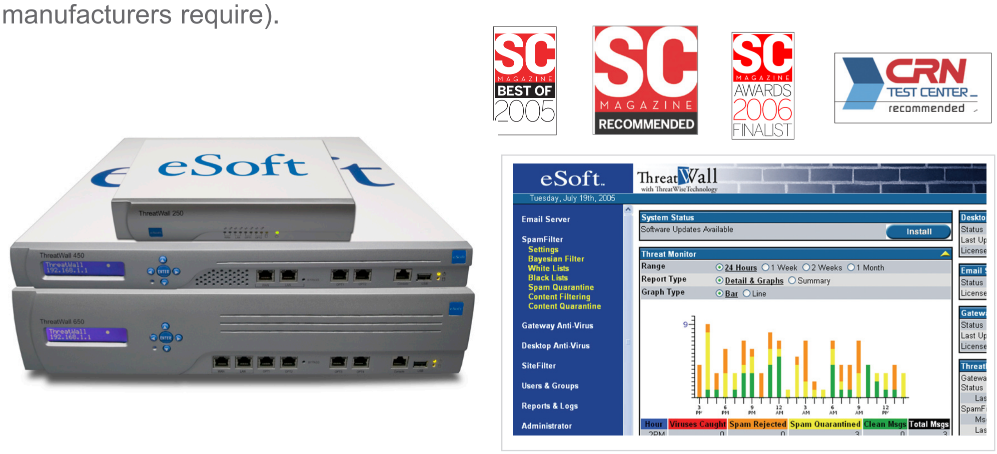
InstaGate 604

InstaGate 806

Figure 10 - InstaGate Integrated Security Gateways

ThreatWall Content Security Appliances

The ThreatWall is an award-winning platform that performs ultra-high-performance Deep Packet Inspection services such as Anti-Virus, Anti-Spam, Web URL Filtering as well as Intrusion Prevention, Anti-Phishing and Anti-Spyware. ThreatWall is tailored for networks with an existing Firewall/VPN system, and can be deployed either in-line in Transparent mode, or in an off-line proxy mode, making it exceptionally versatile for diverse network environments. Additionally, the ThreatWall scans in both inbound and outbound traffic, obviating the necessity for different devices to be dedicated to inbound and outbound traffic (which many manufacturers require).



Tuesday, July 19th, 2005

System Status
Software Updates Available

Threat Monitor
Range ● 24 Hours ○ 1 Week ○ 2 Weeks ○ 1 Month
Report Type ● Detail & Graphs ○ Summary
Graph Type ● Bar ○ Line

Hour	Viruses Caught	Spam Rejected	Spam Quarantined	Clean Msgs	Total Msgs
2PM	0	0	3	0	3

Figure 11 - ThreatWall Content Security Appliances

SoftPaks and the SoftPak Director

At the core of both the InstaGate and ThreatWall appliances is eSoft's patented (U.S. Patent No. 6,961,773 B2) and industry-renowned SoftPak and SoftPak Director (SPD) architecture for enforcing and managing Deep Packet Inspection services. As shown in Figure 12 below, SPD is the mechanism by which:

- Software services are added to the InstaGate and ThreatWall products
- Signature updates are automatically scheduled and downloaded to each device
- Subscription maintenance and billing is performed

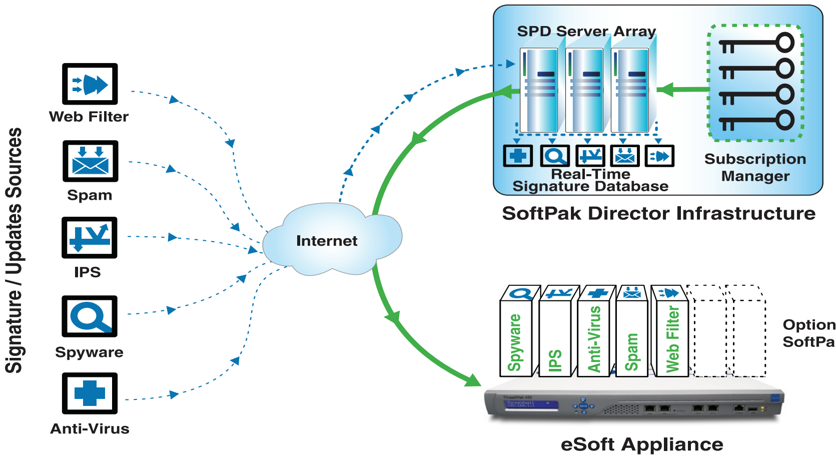
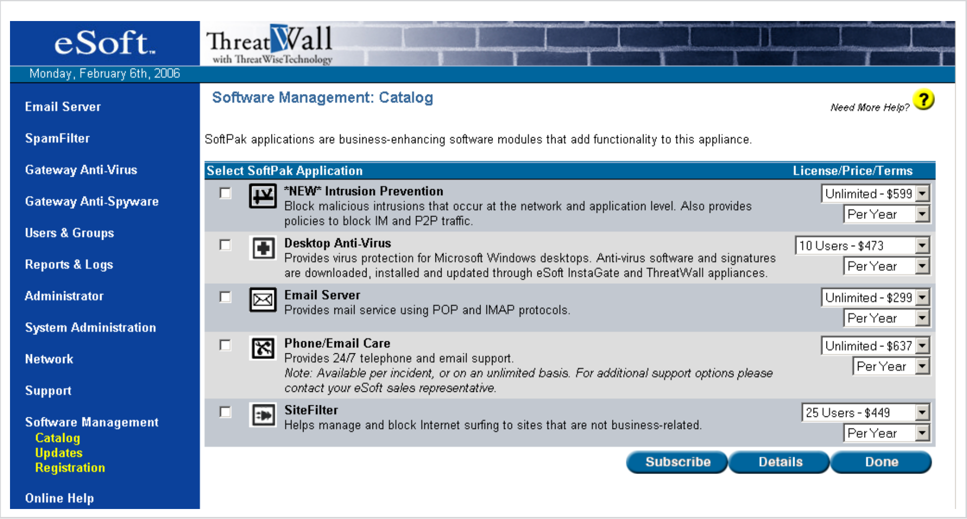


Figure 12 - eSoft's patented SoftPak Director architecture

SoftPaks are optional software modules for eSoft security appliances that allow DPI services such as Anti-Virus, Intrusion Prevention, Anti-Spyware, Anti-Spam, etc. For many SoftPaks, eSoft partners with industry-leading security software partners to offer our customers the most effective, cutting-edge technologies for combating dynamic threats.



Software Management: Catalog

SoftPak applications are business-enhancing software modules that add functionality to this appliance.

Select SoftPak Application	License/Price/Terms
□ ***NEW* Intrusion Prevention** Block malicious intrusions that occur at the network and application level. Also provides policies to block IM and P2P traffic.	Unlimited - $599 Per Year
□ **Desktop Anti-Virus** Provides virus protection for Microsoft Windows desktops. Anti-virus software and signatures are downloaded, installed and updated through eSoft InstaGate and ThreatWall appliances.	10 Users - $473 Per Year
□ **Email Server** Provides mail service using POP and IMAP protocols.	Unlimited - $299 Per Year
□ **Phone/Email Care** Provides 24/7 telephone and email support. *Note: Available per incident, or on an unlimited basis. For additional support options please contact your eSoft sales representative.*	Unlimited - $637 Per Year
□ **SiteFilter** Helps manage and block Internet surfing to sites that are not business-related.	25 Users - $449 Per Year

On the eSoft appliance itself, an intuitive GUI-driven menu (shown below) guides the user through not only what SoftPaks are installed on the system, but it also displays additional SoftPaks that area available for purchase and download. This all happens automatically through the appliance… no additional browsing required.

eSoft features the industry's most in-depth array of security and productivity software solutions, described in detail below.

ThreatPaks

Network ThreatPak

Modern network threats such as Spyware, Worms and Trojans were built to bypass traditional firewalls. Worse yet, technologies such as Instant Messaging (IM) and Peer to Peer networking have opened up serious holes in the security fabric that are incredibly hard to detect and prevent. The Network ThreatPak combines many of eSoftís proven security technologies to provide the network and its users protection from the dynamic threats that cause network outages, Virus infections, Spyware installs and loss of intellectual property.

Features:

- Real-time Spyware Protection
- Active Intrusion Prevention
- Gateway Anti-Virus for Web and FTP
- Instant Messaging and P2P Application Control
- MySpace and ìSocial Networkingî Application Control
- eSoft Distributed Intelligence Architecture Integration
- Detailed Reporting and Statistics

Web ThreatPak

Assure maximum workforce security and productivity by monitoring and enforcing the use of organizational Internet resources. Web ThreatPak also protects against legal liability brought on by inappropriate/illegal use of Internet resources. A database containing millions of global URLs is continually updated with web sites in 30 categories. Policy based control allows selection of which categories should be blocked at different times of day, and which users are affected.

Features:

- 30 Content Categories
- Millions of URLs
- Block Spyware Sites
- Automatic Updates
- Custom Categories
- Authentication
- User/Group Policies
- Day/Time Policies
- Logging and Reporting
- Custom White/Black Lists
- Custom URLs
- Integrated Web Caching
- Custom Block Message
- Simple Installation
- Web Based Administration

Email ThreatPak

Email ThreatPak contains everything needed for email security, content filtering, quarantine and user management, and spam mitigation. The latest Spam-fighting technology is combined with a powerful Anti-Virus and content scanning engine to provide affordable, comprehensive protection from both external and internal.

Features:

- Automated Signature Updates
- Real Time Blackhole Lists
- Customizable White and Black Lists
- Phishing Protection
- Attachment Stripping
- Compressed/Archive Files
- Address Verification
- SPF (Sender Policy Framework)
- Bayesian Filtering
- Heuristic Analysis
- Rule-based Spam Scoring
- Historical Averaging
- Keyword Filters
- Reject, Redirect, and Tagging Email Policies
- Admin and User Quarantine
- Web-based Administration
- Reports, Statistics, and Graphs
- Simple Installation

SoftPaks

Desktop Anti-Virus / Anti-Spyware

This easy-to-deploy SoftPak, which combines full Anti-Virus and Anti-Spyware protection into a single, easy-to-manage client, is a key tool in protecting the organization from costly network outages caused by Viruses, Worms, Trojans and Spyware. Offers secure centralized installation, administration and control to remove ll traces Viruses, Worms and Trojans and Spyware, and also removes Spyware from infected computers.
Automatic signature updates an 'invisible' deployment ensure that users are always protected at the maximum level. The use may not uninstall the software.

This client proactively protects users from internal threats such as Disk, CD or USB and prevents Spyware on laptops that leave the corporate network. Administrators can set policy controls to quarantine, trust or delete various levels of Spyware. Policy controls are also defined to keep IT managers informed of threats with custom reports and Spyware alerts which are all logged back to the server console.

Gateway Anti-Spyware

Gateway Anti-Spyware combines signature matching, intrusion prevention and web filtering techniques to detect and prevent Spyware from infecting the network, whether delivered by web, email or other delivery mechanisms. Infected computers on the internal network are also detected and blocked from sending private data to Internet collection sites. Proactive security at the gateway stops new Spyware infections, prevents confidential data from leaving the network and eliminates resource drains that result from reactive measures of constantly scanning and cleaning each computer on the network.

SiteFilter

Filters Internet content according to your organization's security policies and user guidelines. It allows you to manage Internet access ranging from simple access restrictions to complete blocking of any site. SiteFilter includes a base access control list of more than four million URLs covering 12 languages, all categorized into 40 different content groups, ten of which you can define and customize. In combination with ThreatWise Technology, SiteFilter enables implementation of highly customized and detailed access restrictions-by category, user, day, and time-for improved business productivity and liability control.

Offers IT managers an affordable, reliable alternative to more expensive email solutions. The Mail Server SoftPak supports all the features you would expect in a much more expensive solution, including user/group administration, distrbution lists, configurable forwarding, aliasing, autoresponders and both sender and local address verification. The Mail Sever SoftPak supports both POP3 and IMAP, and can even be run directly on your ThreatWall for a completely unified solution.

Email Content Filter

Scans all incoming and outgoing email for user-defined keywords and phrases embedded in the email body, as well as many attachment types. The admin can quarantine email or forward it for review. Email content filter is essential for companies that want to enforce company policies or meet regulatory compliance requirements. Content Filter also allows customers to create custom lists of the file types to be blocked, such as .exe, .p2p, .vbs, etc. Blocking file types gives administrators the flexibility to block files that could be a potential threat to network security.

Complete Email / Webmail Server

The complexity of providing, managing and securing email access can be a daunting task for an IT manager. Complete Mail Server is an all-inclusive, reliable and standards-based email server with features you would expect to find in a much more expensive solution. In addition to sending and receiving email using a desktop email program the included Webmail server allows users to send and receive corporate email from any web browser. eSoft's security expertise ensures your email server is secure and regularly updated to ensure protection from the latest threats.

Internet Failover *(InstaGate Only)*

The Internet Failover Softpak is your insurance that your organization will not be crippled by an interruption in your internet service. Internet Failover monitors your network for Internet connectivity and automatically switches over to a second provider when an outage is detected. Once regular services is restored, Instagate automatically switches back to the primary connection.

High Availability *(InstaGate Only)*

eSoft's High Availability SoftPak provides automatic failover from your company InstaGate to an online backup InstaGate, also known as a hot standby. The backup InstaGate monitors the health of the primary InstaGate and activates when it detects failure, ensuring that your network remains connected to the Internet and protected by the firewall. Once activated, the backup InstaGate continues to monitor the health of the primary InstaGate and reverts to backup status when the primary InstaGate becomes available.

LAN Bypass *(ThreatWall Only)*

Removes a single point of failure so that essential business communication can continue while a network failure is diagnosed and resolved. In the event of a power, hardware or software failure Hardware Bypass will automatically activate allowing network traffic to continue. Traffic between the LAN and WAN is allowed without interruption. The Bypass LED on the front of the ThreatWall indicates if bypass is activated.

VPN Manager *(InstaGate Only)*

VPN Manager is eSoft's global VPN management solution that makes it simple to centrally manage a distributed network of InstaGate security appliances and mobile users from one location. With just a single operation, large scale VPNs can be created for an entire organization, securely connecting corporate headquarters, branch offices, remote users, and partner extranets. VPN Manager speeds and simplifies VPN deployment, reduces IT resource requirements, and ultimately lowers the overall cost of building and managing a VPN.

Part 5 - Summary

The evolution of network and application-layer security threats has significantly altered the requirements for a modern network security architecture. Just a few years ago, a simple Stateful Packet Inspection (SPI) Firewall was sufficient to stop basic attacks such as port scans and DoS attacks. Now, application-layer buffer overflow attacks, Spam, Spyware, Polymorphic Trojans, Blended Threats, Phishing and Pharming are causing unprecedented amounts of financial damage and loss of productivity.

To detect and prevent these threats, a completely new kind of security system is required. This system still performs all of the classic functions of the firewall, but much more. This system is based on Deep Packet Inspection (DPI) technology, where the appliance has the brains - and the horsepower- to inspect every byte of every packet… even across multiple thousands of streams of packets. The modern DPI security appliance resembles its SPI predecessor only by its looks… inside is a completely new system, designed from the ground up to deal with the rigors of in-depth packet inspection. The DPI security appliance also differs from its SPI predecessor in that it requires real-time security services to ensure it is protecting against threats that are not only relevant this week, but also this hour. The great news for the IT manager is that these security services are typically broken down into optional a 'la carte services where they can be deployed on an as-needed basis.

eSoft security gateways are the industry's most highly integrated DPI systems available. Whether complementing an existing firewall with the award-winning ThreatWall, or completely replacing a legacy system with the highly integrated InstaGate, eSoft provides unparalleled protection from virtually any type of network-based threat. In addition, eSoft's SoftPak Director (SPD) architecture, based on a sophisticated, fault-tolerant back end server framework, ensures that all deployed units are protecting at the highest levels of performance, with the most up-to-date signature and threat definition databases available.