



# Most Exploitation is Internal

## Learn New Proactive Defenses Against this Global Networking Epidemic

by Bernard Girbal  
Vice President, International Operations  
NetClarity, Inc.

#### Worldwide Headquarters

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## Agenda



- Learn about Internal Exploitation, Common Vulnerabilities and Exposures (CVEs) and how hackers, viruses, worms, spyware, botnets, rootkits, Trojans, cybercriminals and cyberterrorists use CVEs to exploit networks. Over 95% of successful attacks are exploits of these CVEs, while most also happen behind the firewall.

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## About Me



- ✓ *My background :*
- ✓ *VP International Operations at NetClarity*
- ✓ *VP EMEA at Packeteer*
- ✓ *VP EMEA at Trend Micro*
- ✓ *Etc...*

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## About My Company – NetClarity, Inc.



**“Most Innovative New Security Product for 2011”**

- Award during RSA2011 by InfoSec Products Guide

“NetClarity Picks Up Where Firewalls, Anti-virus, Intrusion Detection Systems and Intrusion Prevention Systems Leave Off”

— John Gallant, President, Network World



“The Most Innovative NAC Vendor in the World”

— Network Products Guide, Hot Companies, 2009, 2010, 2011



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## Looking outward with old tools...



“over 80% of successful exploitation happens from the inside, behind the firewall”  
- SANS.org

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## Fact: Nothing with an IP Address Is Secure

- No device is safe – all IP-based devices are exposed to exploitation:

It is a target

It can be spoofed

It can be infected

It can be remotely controlled

It is probably already infected



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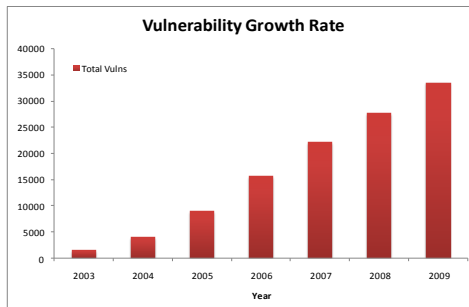


## Fact: Everyone can be exploited internally!



**All of our internal systems have holes!**  
(also known as common vulnerabilities and exposures - CVEs)

According to the USCERT, SANS, FBI and MITRE, over 95% of security breaches are a direct result of exploiting a Common Vulnerability and Exposure (CVE®).



See: <http://nvd.nist.gov>

80% of all successful attacks occur from the inside (malicious insider, rogue wireless, the 'cleaning company' tapping of your network with an unknown and untrusted laptop)

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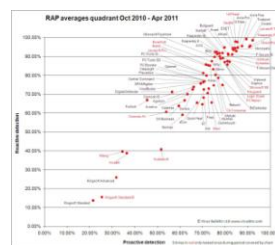
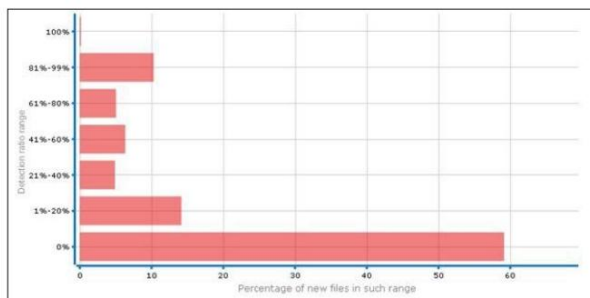
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## Fact: Exponential Growth of Malware Propagation Internally!



Virus Total has nearly 60% undetectable malware samples, each day

<http://www.virusbtn.com>

Your favorite anti-virus program catches **no more than 70-90% of malware!**

**We agent-lessly catch the new zero-day malware that they miss!**

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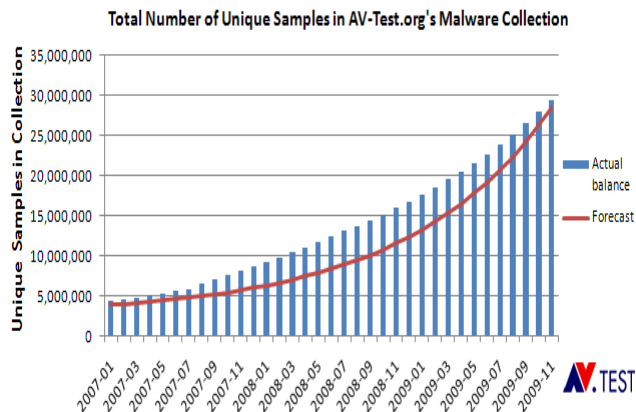
## Fact: Anti-virus is dead!

### No One Can Keep Up With New Malware

According to independent malware test labs, ALL ANTI-VIRUS software agents FAILED to stop ALL new threats, known as zero-day malware.

See:

<http://www.anti-malware-test.com>  
<http://blogs.zdnet.com/security/?p=5365>  
<http://av-test.org>



Report: 48% of 22 million scanned computers infected with malware

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## Fact: Wireless Will Never Be Secure!

- **WEP was easy to crack; now WPA is also...**

Recently deployed tools such as Back Track v5.0 allows you to break wireless encryption by attacking the smaller 24-bit session initiation key and then gaining full "trusted" access to a wireless router.

- **Wireless Routers have Critical Flaws (CVEs)**

Now you can break into the admin interface of a wireless router by sending malformed packets from your laptop ...not worrying about the encryption, see [NVD.NIST.GOV](http://NVD.NIST.GOV) and type in "wireless"

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## Fact: Let's take VoIP as an exemple



VoIP is at very high risk of attack, including Eavesdropping and Denial of Service(DoS) attacks, as well as exploitation of CVE®s.

### Eavesdropping:

Would you make a purchase over a VoIP connection, giving your credit card information out over the VoIP phone? (over 100M credit card numbers stolen over the IP protocol)

### Denial of Service:

What happens when you need to place an emergency phone call (E911)? Can you do it with VoIP? Not today and not guaranteed (without copper wire backup connection).

**Exploiting CVE®s:** More on that to follow...

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## Internal VoIP Hacking.



- Dozens of voice over IP (VoIP) holes....known as Common Vulnerabilities and Exposures (CVEs)
- Take over the administrative console remotely by exploiting one of many CVEs
- Launch a Man in the Middle attack:  
Voice over Misconfigured IP Telephony (aka VOMIT) – use a TCP/IP  
wireshark/ethertrace:
  - a) save a “dump” file of network traffic
  - b) then run the file through this tool and get a .WAV file to play back conversations...

<http://hakin9.org/magazine/1255-securing-voip> (written by our CTO)

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## Sample Internal VoIP Vulnerabilities



- **Confidentiality and Privacy**
  - Switch Default Password
  - Classical Wiretap
  - ARP Cache Poisoning
  - ARP Flooding
  - Web Server Flaws
  - IP Phone Netmask Vulnerability
  - Extension to IP Address Mapping
- **Integrity Vulnerabilities**
  - DHCP Server Insertion
  - TFTP Server insertion
- **Availability and Denial of Service Issues**
  - Account Lockout
  - CPU Resource Consumption
  - Buffer Overflows and Improper Packet Handling

Remember : C.I.A !!!!

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## Exploitable VoIP CVE<sup>®</sup>s (see [cve.mitre.org](http://cve.mitre.org))



### CAN-2005-2181

- Summary: Cisco 7940/7960 Voice over IP (VoIP) phones **do not properly check the Call-ID, branch, and tag values in a NOTIFY message** to verify a subscription. This allows remote attackers to spoof messages such as the "Messages waiting" message.

### CVE-2002-0835

- Summary: Preboot eXecution Environment (PXE) server allows remote attackers to cause a denial of service (crash) via certain DHCP packets from Voice-Over-IP (VOIP) phones.

### CAN-2002-0882

- Summary: The web server for Cisco IP Phone (VoIP) models 7910, 7940, and 7960 **allows remote attackers to cause a denial of service (reset) and possibly read sensitive memory** via a large integer value in (1) the stream ID of the StreamingStatistics script or (2) the port ID of the PortInformation script.

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Sorry if you just ate lunch...



## VoMIT—Voice over Misconfigured Internet Telephone:

- The vomit utility **converts a Cisco IP phone conversation into a wave file** that can be played with ordinary sound players.
- Vomit requires a **tcpdump** output file.
- Example of how to run VoMIT
  - `$ vomit -r phone.dump | waveplay -S8000 -B16 -C1`

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## Malware Root Cause - CVEs



- **Common Vulnerabilities and Exposures (CVEs)**
  1. Although there might be 9,000,000 signatures in your McAfee or Symantec anti-virus scanner database (and growing exponentially), there are only 47,000 CVEs. If you close just one CVE, for example, you can block more than 110,000 variants of the W32 malware.
  2. If you aren't visiting <http://nvd.nist.gov> to see what kind of exploitable holes you have in your network, cyber criminals CERTAINLY are...
  3. Everything with an IP address has a CVE, you need to figure out which ones are critical holes and how to patch, reconfigure and remove them—i.e. system hardening.

**...and MALWARE LOVES TO EXPLOIT THESE HOLES...**

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## Traditional Countermeasures



- **Anti-virus** = At least 24 hours BEHIND the current malware threat. Usually infected without knowing it.
- **Firewall** = Easily circumvented or used as part of an exploit because of their exploitable holes (CVEs)
- **Intrusion Detection System (IDS)** = Detects odd or mal traffic AFTER the infected system or hacker system has breached the gates.

Note: Both IPS or UTM Firewall both use similar technology for ‘deeper packet inspection’

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## MOST RECENT IPS GRADE IS A “D-”



NSS Labs Inc. tested 13 of the world’s most powerful IPS products in December 2010. They caught 62% of the attacks, missing 38%.

While the NSS Labs test is revealing, most of the attacks don’t come through the front door (the firewall or IPS) anyway, the come through the back door.

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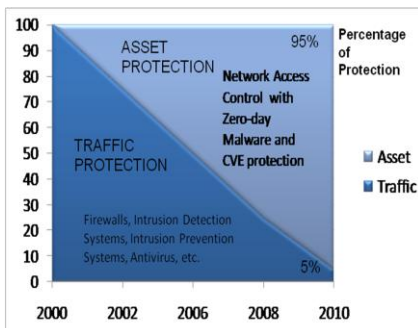
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## You are only 5% secure...Most Risk is Internal!



✓ You invested in firewalls, anti-virus and intrusion prevention to protect your network from the *outside-in*.

✓ Today, most threats happen from the *inside-out*.

✓ Deploy software, hardware, tools, techniques that focus on the inside of your network, protect your "intranets"!!!

## Asset Protection vs Traffic Protection

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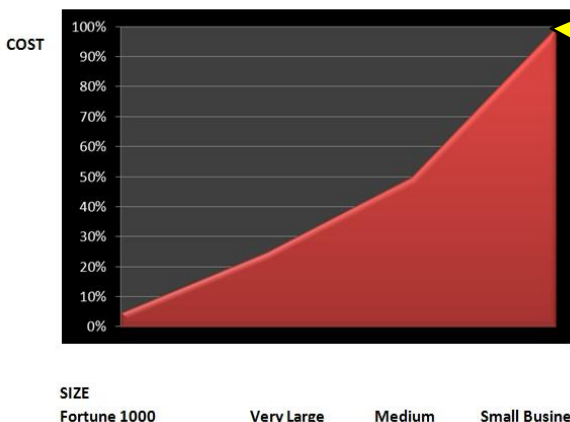
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## You are *the* target...Hackers shift attacks to SMBs



One Breach Could Put You Out of Business!

In this case, "the smaller you are, the harder you fall."

Top security experts believe that this is an explosive trend.

See: [www.privacyrights.org](http://www.privacyrights.org)

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**NETCLARITY**  
PREEMPTIVE, PROACTIVE PROTECTION

### Case: TJMAXX (very large SMB)



#### Cost of Breach

- Hackers Break Through Wifi
- Spoof MAC Address of Trusted Network Device (Barcode Scanner)
- Find CVEs in SQL Database
- Install Backdoor Code
- Steal 100,000,000 Credit Cards

**\$225,000,000 USD in damages and fines**

#### Cost to Avoid Problem

- Deploy 3,000 NACwall Nano Appliances at each Marshalls, TJMaxx, TKMaxx and Winners retail outlets owned by TJMAXX Corporation
- Deploy NACwall Enterprise appliance with Command Center at Headquarters of TJMAXX

**~\$5,000,000 USD including appliances and services**

**TJMAXX Paid 45x More Than Needed If They Went With NACwalls.**

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**NETCLARITY**  
PREEMPTIVE, PROACTIVE PROTECTION

### Case: BurgerMe (very small SMB)



#### Cost of Breach

- Hackers Break Through Wifi
- Spoof MAC Address of Trusted Network Device (Barcode Scanner)
- Eavesdrop on over 1,000 credit card transactions

**BurgerMe went out of business because of this breach.**

#### Cost to Avoid Problem

- Deploy 1 NACwall Nano Appliance at each BurgerMe restaurant location behind each wireless router.
- Deploy NACwall Enterprise appliance with Command Center at Headquarters of BurgerMe

**~\$25,000 USD including appliances and services**

**BurgerMe Would Still Be In Business If They Deployed NACwalls.**

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## A New Paradigm in Proactive Defense



### – Understanding The Risk Formula

$$R = T \times V \times A$$

(R)isk = (T)hreats x (V)ulnerabilities x (A)ssets

Threats = Cybercriminals, malware, malicious insiders

Vulnerabilities = Weaknesses that threats exploit

Assets = People, property, your network, devices, etc.

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## Proactive Defense Continued



- **Threats** need to be detected, deterred, defended against and defeated in real time or expect DOWNTIME.
- **Vulnerabilities** need to be detected, deterred, defended against and defeated (i.e. removed – system hardening, reconfiguration, patching, etc.) as quickly as possible or expect to be EXPLOITED.
- **Assets** need to be controlled – which ones gain access to your network/infrastructure and those that are trusted but weak or infected need to be quarantined in real time or expect MALWARE PROPAGATION.

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## Your Proactive Solution!



1. Manage Internal Risk (regularly)
2. Remove your CVEs (constantly)
3. Educate Your Employees About Internal Risks
4. Create Best Practices Policies (like ISO27001) and Watch Employee and Guest Behavior and look for anomalies (email, file access, db access, wrong location, wrong vlan, wrong time, etc.)
5. Leverage Strong Encryption
6. Deploy New Host-based Intrusion Prevention (HIPS)
7. Deploy New Access Control methods

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## BEST FREE CVE SCANNING TOOLS



- OpenVAS for tests across networks

<http://www.openvas.org>

- OVAL for host-based tests

<http://oval.mitre.org>

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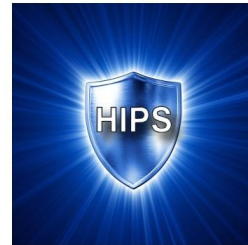


## Your First Line of Defense: HIPS



### Host-based Intrusion Prevention System (HIPS)

- **PREVX:** <http://www.prevx.com/event>
- **THREATFIRE:** <http://www.threatfire.com>
- **WINPATROL:** <http://www.winpatrol.com>
- **COMODO FIREWALL:** <http://www.comodo.com>



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## Employee Awareness & Training



### Training Sessions

1. Invite employees to a quarterly “lunch and learn” training session.
2. Give them “bite-sized” nuggets of best practice information.
3. Give an award once per year to the best INFOSEC compliant employee who has shown an initiative to be proactive with your security policies.
4. If you can keep them interested, they will take some of the knowledge you are imparting into their daily routines. That's the real goal.

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## Employee Awareness & Training (Cont')



### Campaigns

1. You should begin a campaign to educate all employees in your organization to join your mission to protect corporate information.
2. Create your own "security broadcast channel" via e-mail or really-simple syndication (RSS) and get the message out to your corporate work force.
3. You can also give them "security smart" tips or alert them to a new phishing scam or that the corporation had to let go of an individual who was attempting to steal corporate information.
4. Keeping the entire team in the loop will help bolster the corporate security posture.

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## Corporate Security Policies



### My favorite security models are:

- The powerful COBIT model at <http://www.isaca.org>
- The e-tail/retail oriented PCI model from the PCI Security Standards Council at <https://www.pcisecuritystandards.org/>
- The extremely comprehensive international model called ISO27001/17799 from <http://www.iso.org/>



*Any of these models will be a great starting point.*

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## Leverage Strong Encryption



1. There's an old saying "loose lips sink ships."
2. The best practice is to look at all aspects of electronic communications and data manipulation throughout your enterprise. That should include all instant messaging, file transfer, chat, e-mail, on-line meetings and webinars plus all data creation, change, storage, deletion and retrieval.
3. How are customer records stored? How are electronic versions of other confidential information protected? Backing up the data is not enough.
4. Set up a VPN for external network access. Make sure the systems that access your network through the encrypted tunnel are also not the weakest links in your infrastructure—deploy HIPS on endpoints.

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## Leverage Strong Encryption (cont')



5. You can encrypt everything from your hard drives to your e-mail sessions to your file transfers.
6. There are numerous free tools out there like <http://www.truecrypt.org> for hard drives and <http://www.openssl.org> for Web, e-mail and instant messaging, plus the grand-daddy of free encryption at <http://www.openpgp.org> (PGP = Pretty Good Privacy).
7. You'll need policies in place for key storage and password access so if ever the keys and passwords are lost by the end-users, you'll have a way back in to decrypt the information, reset the keys or change the passwords.
8. You might find out that some of the servers and services you are running already offer encryption if you simply check the box and turn on this feature.

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## Next Generation Network Access Control



- Look for NAC solutions that:
  - Track new threats, behind firewalls
  - Block and quarantine these threats
  - Help find and fix vulnerabilities
  - Control all trusted assets network access
  - Network Equipment Agnostic
  - Operating System Agnostic

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## Next Generation NAC, According to Gartner...



**Gartner**

“When evaluating NAC solutions, look for vendors that understand the consumerization trend and support, or have plans to support, policies for managing the non-Microsoft endpoints that will inevitably attempt to connect to your network...

NetClarity is the vendor that targets SMBs and can manage all endpoints. Its family of NACwall appliances use an agentless (no additional software on the PCs) approach to baseline the health of the endpoints. **NACwalls** are deployed out of band in LANs, so they **install easily** and are **not in the line of traffic...**”

Gartner NAC Report, 2010

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## Sample Awards...



**“Most Innovative New Security Product for 2011”**

**“NetClarity – Who’s Who of NAC”**

- Channel Reseller News (CRN.com)

- Awarded during RSA 2011 by InfoSec Products Guide

**...and many more...**

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## NACwalls: Inside-Out Network Security™ Appliances



**From the Smallest NAC Appliances in the world to the most scalable Enterprise Appliances with a built-in Command Center**



1. Harden your network from the inside-out: Find all your network holes (CVE@s) on the inside of your network and show you how to fix them.
2. If you trust someone but their device is infected with new (zero-day) malware, we'll stop it from affecting anyone else, automatically.
3. Control access by any and all types of devices – if you don't want them on the network, they don't get on the network.

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## NACwall Advantages



- Instantly Stops Criminals and New Malware Attacks
- No Network Infrastructure Upgrades Necessary
- Non-inline and Agentless (no client software necessary)
- Works with All Operating Systems and Attached Devices
  - From Gas Pumps, to Barcode Scanners to VoIP Phones, Droids, Blackberries, iPhones, iPods, iPads, iTouches, iPhones to Desktops, Laptops, Netbooks and Critical Servers
- Easily Secures Both Wired and Wireless Networks
- Fits in your Closet, on your Rack and *within your Budget.*



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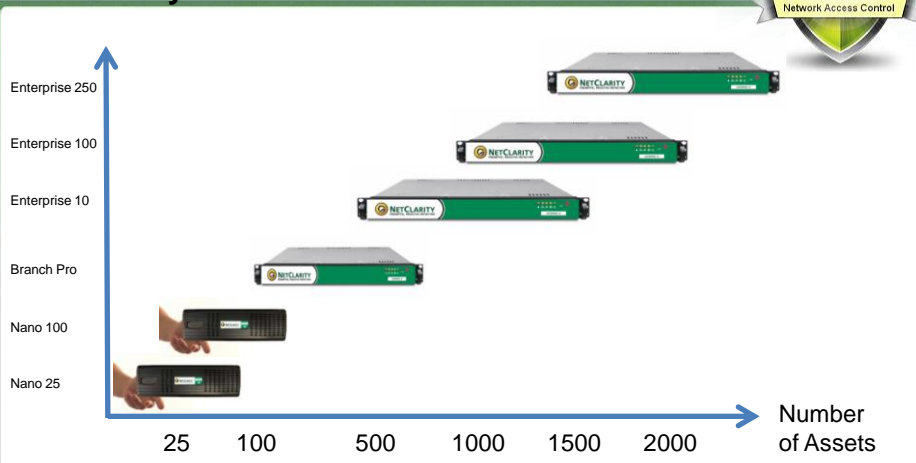
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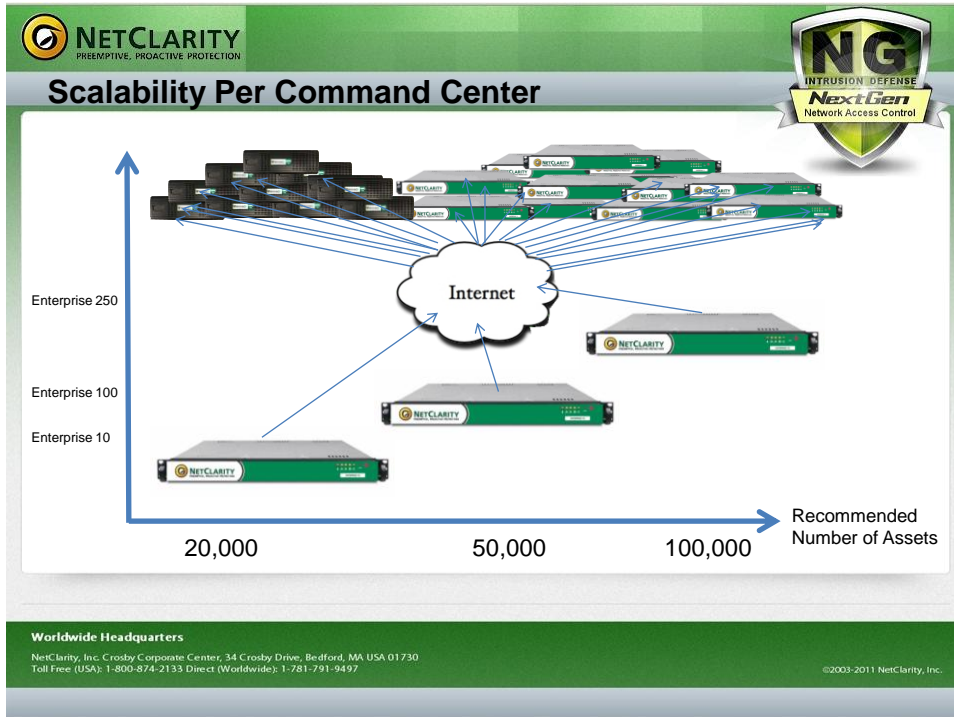
## Scalability Per Unit



### Worldwide Headquarters

NetClarity, Inc. Crosby Corporate Center, 34 Crosby Drive, Bedford, MA USA 01730  
Toll Free (USA): 1-800-874-2133 Direct (Worldwide): 1-781-791-9497

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**NETCLARITY**  
PREEMPTIVE, PROACTIVE PROTECTION

**Thoughts for the Day...**

**NG**  
INTRUSION DEFENSE  
*NextGen*  
Network Access Control

- Find and fix your vulnerabilities...
- Keep a keen eye on your “intranets”
- Document your security activities...  
be vigilant!
- Be preemptive, be proactive—get one  
step ahead of the next threat...

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## My Gift to You...



- Send me a hello email afterwards at:
- [bgirbal@netclarity.net](mailto:bgirbal@netclarity.net)
- I will send you a link to download this PPT and one free year of Hakin9 Magazine (a \$600 value)

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• **Thank You**

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