

TOMORROW starts here.



Cisco + SourceFire: Threat-Centric Security Approach

BRKSEC-2061

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Ciscolive!

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Agenda

- Today's Security Challenges
- A Threat-Centric and Operational Security Model
- Next Generation Firewall & IPS
- Content security & Advanced Malware Prevention
- Network as a Distributed Firewall
- Network as a Visibility Sensor
- Reducing Complexity and Increasing Capability
- It takes an Architecture
- Summary





Session Objective

Provide a quick review of today's dynamic threat landscape and outline the Cisco threat-centric and operational security model that spans a range of attack vectors to address the full attack continuum – before, during, and after an attack.





Security Perspective

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The Problem is **THREATS**



Today's Advanced Malware is Not Just a Single Entity



100 percent of companies surveyed by Cisco have connections to domains that are known to host malicious files or services. (2014 CASR)

that hides in plain sight



Top Cyber Risks for Users



10% 64%

IE requests running latest version

Chrome requests running latest version



The Challenges Come from Every Direction





Cisco 2015 Annual Security Report

Now available:

cisco.com/go/asr2015



Impact of a Breach

Breach occurs 60% data in 54% of breaches remain Information of up to breaches is stolen undiscovered for months 750 million individuals on the black market in **hours** over last three **years** Ť \triangle 4022 5201 2244 **START** HOURS MONTHS **YEARS** Cisco

Source: Verizon Data Breach Report 2014

Breach/Detection Time Delta is Not Improving

Percent of beaches where time to compromise (red)/time to discovery (blue) was days or less



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Why?



The Configuration Problem

- Poor awareness of true operational environment
- Change to environment requiring configuration/posture changes unrecognised
- Detection content unavailable
 0-day
- No anomaly detection mechanisms in place



The Organisational Problem

- False positive rates too high
 - Operator overload due to mass of equally meaningless events that must be contextualised
- Frequently technologies are deployed but not properly operationalised
 - Check-box security
- In 2014, the average cost of an organisational data breach was US\$3.5 million Source: The Ponemon Institute

Defenders Less than half of security practitioners leverage known effective practices

SecOps



Identity Administration and Provisioning	43%
Patching and configuration as defence	38%
Pentesting	39%
Quarantine malicious applications	55



If you knew you were going to be compromised, would you do security differently?



Addressing The Configuration Problem

- Visibility Architecture
 - Collect context about the operational environment
 - Continuously in real-time
 - Visibility data is used to recommend configuration of security infrastructure
 - Real-time notifications of change to drive real-time change in security posture
- Content
 - Rapid development and dissemination of updated detection is a fundamental
 - Vendor
 - Security operations teams



Addressing The Organisational Problem

- Contextualisation
 - Event loads are high due to misconfiguration
 - Even when well tuned, raw events must be contextualized automatically when possible
- Operationalisation
 - That's your job…
- Engagement from corporate boards is crucial in setting security priorities and expectations
 - Boards need to know what the cybersecurity risks to the business are and their potential impact
 - CIOs must ask tough questions about security controls that are meaningful to the board and outline the business implications

A Threat-Centric and Operational Security Model



A Threat-Centric and Operational Approach



Cisco: Covering the Entire Continuum



Building a Threat-Centric Cisco Security Architecture





Next Generation Firewall and Intrusion Prevention System

in all





ASA with FirePOWER Services Best-in-Class NGFW

New ASA Capabilities



Cisco FireSIGHT Management Automates Operations

Cisco

Content Security

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Email and Web are the Most Prevalent Attack Vectors Risks

- App development has moved to web and mobile
- Explosion of
 - Cloud Services
 - Social Networking
- Email still one of the most critical business applications

- Java exploits represented 93% of all 2014 Indications of Compromise*
- Blended attacks combine social engineering, Phishing and web malware
- Social Networking users increasingly being targeted for data theft and social engineering attacks
- Loss of productivity due to social networking, gaming, etc.





Email Cisco Zero-Hour Malware Protection

Advanced Malware Protection



Email Outbreak Filters

Outbreak Filters Advantage

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- More protection than just AV alone ٠
- Leverages CSI Telemetry to detect outbreaks .
- Average AV signature lead time: Over 13 hours ٠
- Average Cisco lead time: <60mins ٠

CSI Filter Quarantine **Outbreak Filters in Action** Advanced Malware Protection Cloud Powered Zero-Hour Zero-Hour Virus Malware Detection and Malware Detection

Cisco®

http://www.senderbase.org/static/malware/

Virus

Dynamic



Web Pages Contain Hidden Threats Real-time Sandbox Analysis for Zero-day Defence



Every object on the page is analysed



Detects ~20% more threats*



Real-time Emulation



Cisco Public

Outstanding Blended Attack Defence Cisco Email & Web work as a system



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Cisco Public

Network as a Distributed Firewall

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Protection Against Advanced Persistent Threats Network Segmentation is critical

PAYMENT CARD SKIMMERS

CYBER-ESPIONAGE

DOS

incidents quickly.

Segment your network

Keep good logs



Department of Defence

Why is network segmentation and segregation important?

Once a malicious cyber adversary compromises your network, usually through the compromise of a system under the control of a legitimate user by means of social engineering, they will attempt to move around your network to locate and access the information they are targeting. This is known as propagation or lateral movement.

In order to minimise the impact of such a compromise, it should be as hard as possible for the 9. malicious cyber adversary to find and access the information they seek and move undetected around a system or network, and remove the information from the network once they locate it.

Verizon DBIR 2014: Recommended Controls

RECOMMENDED CONTROLS

Isolating the root cause of an espionage-related breach is a bit of Beyond the basics, there are some specific practices that a snipe hunt. Sure, victims make mistakes (minor and otherwise) organizations concerned with state-affiliated and other that are exploited in the process, but the real root issue is a determined adversaries should consider. These roughly follow datermined skillful nationt and well-resourced adversary who critical points in the path of attack, where victims have the best will keep poking until he finds (or makes) a hole. With that in chance to recognize and respond. these adversaries often take advantage of. Break the delivery-exploitation-First we'll start with a few blocking and tackling fundamentals

that you really ought to be doing regardless of whether or not you're worried about espionage. If you don't do these, all those super-advanced cybertastic APT kryptonite solutions may well

Patch ALL THE THINGS!

Exploiting browser, OS, and other third-party software (e.g. Flash and Java) wilnerabilities to infect end-user systems is a common initial step for attackers. Keeping everything up to date will make that step a lot harder to take.

Use and update anti-virus (AV)

without an immune system. It might not protect you from the dreaded zero day, but let's be honest - many espionage victims and on the endpoint) can go a long way to detect anomalies in applications and find pesky shells and other malware.

Train users

After gaining access, attackers will begin compromising systems

across your network. ETDR, mentioned above, can help here too.

Two-factor authentication will help contain the widespread and

We mentioned network segmentation in the basics, but since

it a straight shot from patient zero to a full-fledged plague.

doing it well is challenging, we'll mention it here again. Don't make

Watch for user behavior anomalies stemming from compromised

of data within your organization. Compare these to your threat

intelligence, and mine this data often.

unchallenged re-use of user accounts.

the network

accounts.

Stop lateral movement inside

While many proclaim AV is dead, not having it is akin to living Spot C2 and data exfiltration Collect and/or buy threat indicator feeds. In and of themselves still fall to one-zero-zero days (or higher). An up to date AV (in-line they aren't intelligence, but they're certainly useful within intelligence and monitoring operations.

Cisc

Monitor and filter outbound traffic for suspicious connections and potential exfiltration of data to remote bosts. In order to

installation²⁵ chain

analysis of attachments or links included.

Users will be phished, and they will eventually click; we've got

the data to prove it. Focus on implementing a solution that more

completely defends against phishing, such as not relying solely

on spam detection and blocklists, but also doing beader analysis pattern matching based on past detected samples, and sandbox

For more mature organizations, check out the growing collection

of Data Execution Prevention (DEP) and Endpoint Threat

specific products in this report, but you'll find some good

Detection and Response (ETDR) solutions. We don't promote

options in this space by starting your search with some of our

nnection, among the single best sources organization. Compare these to your threat this data often

eral movement inside

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Log system, network, and application activity. This will not only
lay a necessary foundation for incident response, but many
proactive countermeasures will benefit from it as well.
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Good network and role segmentation will do wonders for

or technology. It's not all about prevention; arm them with the

knowledge and skills they need to recognize and report potential

containing an incident, especially where actors intend to leverage

access to one desktop as a stepping-stone to the entire network

Cisco Secure Access Making segmentation easy and dynamic

Identity Services Engine	TrustSec	AnyConnect Secure Mobility	
 Centralised Policy Management Allows for dynamic and micro segmentation AAA Radius Server Guest Access Services BYOD Enablement MDM Integration Device Profiling & Posture assessment pxGrid Context Sharing 	 Provides dynamic network segmentation Access Control using IP/VLAN independent tags Simplifies BYOD access and policie Provides access policy enforcemen on all network devices Vast Firewall Rule Simplification 	Universal Security Client SSLVPN / IPsec Mobile Web Security Network Access Manager Host NAC Agent Certificate Provisioning	
Common Identity and Context Common Policy across Wired, Wireless and VPN			
BRKSEC-2061 © 2015 Cross and the Deployment Appliance Over the Deployment Ciscolic Cloud Ciscolic Cisc			
Simplification of Access Policy with TrustSec



Empower BYOD with ISE & TrustSec



Empowering the User without sacrificing security

Reduced Burden on IT Staff

- Device On-Boarding
- MDM / Posture compliance
- Self Registration
- Supplicant Provisioning
- Certificate Provisioning
- Self Service Model
 - myDevice Portal for registration
 - Guest Sponsorship Portal
- Device Black Listing
 - User initiated control for their devices, black-listing, re-instate, etc
- Support for:
 - iOS (post 4.x)
 - MAC OSX (10.6 10.9)
 - Android (2.2 and onward)
 - Windows (XP, Vista, win7, win8)



Enabling Network-Wide Identity & Context Sharing Cisco Platform Exchange Grid – pxGrid



INFRASTRUCTURE FOR A ROBUST SECURITY ECOSYSTEM

- Single framework develop once, instead of to multiple APIs
- Control what & where context is shared among platforms
- Bi-directional share and consume context at the same time
- Extremely Scalable
- Integrating with Cisco SDN for broad network control functions

ISE TrustSec

III ISCO Identity	Services Engine				ise adm	in Logout Feedb
Authentication	Authorization	Posture Client Provisioning	Security Group Access		of las	k Navigator 👻 🥶
ess Policy Net	vork Device Authorization		Security Group Access	Liements		
as roncy netw						
Irce Tree Destir	nation Tree Matrix					
gress Policy (M	atrix View)					
Edit 🕂 Add	🗙 Clear Mapping 👻 🆓 Configure	OPush Monitor All Dimension 6X10	Ŧ		Show Policy-View-1	- 7
Destination + urce .	Web_Servers (7 / 0007)	Time_Card_Server (10 / 000A)	Manager_Portal (9 / 0009)	Employee_Portal (8 / 0008)	CreditCard_Server (11 / 000B)	
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Network as a Visibility Sensor

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Behavioural Detection Model

As flows are collected, behavioural algorithms are applied to build "Security Events". Security Events will add points to an alarm category to allow for easy summarisation higher degree of confidence of the type of activity detected:



Cyber Threat Defence (CTD) Solution



Advanced Visibility & Investigation

- Partner with Lancope (StealthWatch) to deliver network visibility, security context
- Enhance with Identity, device, application awareness



Reducing Complexity and Increasing Capability

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Visibility is the Foundation

Breach	Understand scope, contain & remediate	
Threat	Focus on the threat – security is about detecting, understanding, and stopping threats	ls Bation) For
Control	Set policy to reduce surface area of attack	
Visibility	Broad awareness for context	



Visibility Must Be Pervasive



Today's Security Appliances





We must integrate more effectively to make more effective security solutions



Two Kinds of Integration

- Front-end integration
 - Most security technologies have information about the environment that they are defending but do not share it
 - Build a Visibility Architecture to collect information about the composition, configuration and change in the environment being defended
- Back-end integration
 - Collect and centralise information about what's happening to the environment and try to figure out what is happening
 - Traditional integration model





Building a Visibility Architecture

- Why?
 - -Automation
 - Contextualisation
 - -Anomaly Detection
 - Event-driven Security
- What visibility is important?



Types of Visibility

- Asset/Network
 - Network topology
 - Asset profiles
 - Address
 - Hardware platform/class
 - Operating System
 - Open Ports/Services
 - Vendor/Version of client or server software
 - Attributes
 - Vulnerabilities
- User
 - Location
 - Access profile
 - Behaviours

- File/Data/Process
 - Motion
 - Execution
 - Metadata
 - Origination
 - Parent
- Security
 - Point-in-time events
 - Telemetry
 - Retrospection





Cisco FireSIGHT Context Collection Platform

Indications of Compromise (3)							
Category	Event Type	Description	First Seen	Last Seen			
Exploit Kit	Intrusion Event - exploit-kit	The host may have encountered an exploit kit	a 2013-09-17 10	6:46:28 🚙 2013-09-	-20 06:35:31	ii i	
CnC Connected	Security Intelligence Event - CnC	The host may be under remote control	a 2013-09-17 16	6:52:11 🛛 🚗 2013-09-	-20 03:55:45	6	
CnC Connected	Intrusion Event - malware-cnc	The host may be under remote control	a 2013-09-17 20	0:09:23 📪 2013-09-	-19 17:32:49	ũ	
WICHW					ecanons		
Exploit Kits		to Known CnC IPs		Office/PDF/Java Compromises			
Web App Attacks			Malware Executions		ecutions		
CnC Connections				Dropper Infe	ections		
Admin Privilege Escalations							



Cisco FireSIGHT Fuels Automation

Impact Assessment and Recommended Rules Automate Routine Tasks

	Last 1 h	our	Total	
de laste et	Policy Information	1		
at all the state of the	Name	Default Production Demo Lab	IPS Policy	
	Description	Sourcefire Provided. For best	results, do not modify.	
	Drop when Inline			
• • • • •	Base Policy Se	curity Over Connectivity is up to date (Rule Update 2013-10-09	÷ -004-vrt)	
And the second	🏂 This policy define	es 0 variables		
	This policy has 9 ⇒ 558 rules genera × 8480 rules drop	038 enabled rules ate events and generate events		
	Image: Set 214 rules to the set 3550 rules to the set 3350 rules to the set 3390 rules to the set 340 rules to t	mends 7154 rule state settings for generate events o drop and generate events o disabled	7430 hosts	
Manne	Policy is not using the Last generated: 2013 0	recommendations. Click to change reco Oct 10 10:15:33	ommendations	

Impact Assessment

Correlates all intrusion events to an impact of the attack against the target



IMPACT FLAG	ADMINISTRATOR ACTION	WHY
1	Act Immediately, Vulnerable	Event corresponds to vulnerability mapped to host
~ 2	Investigate, Potentially Vulnerable	Relevant port open or protocol in use, but no vuln mapped
۲3	Good to Know, Currently Not Vulnerable	Relevant port not open or protocol not in use
٢4	Good to Know, Unknown Target	Monitored network, but unknown host
20	Good to Know, Unknown Network	Unmonitored network

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FireSIGHT Brings Visibility

CATEGORIES	EXAMPLES	Cisco FireSIGHT	TYPICAL IPS	TYPICAL NGFW
Threats	Attacks, Anomalies	V	 ✓ 	~
Users	AD, LDAP, POP3	v	×	~
Web Applications	Facebook Chat, Ebay	v	×	~
Application Protocols	HTTP, SMTP, SSH	v	×	~
File Transfers	PDF, Office, EXE, JAR	v	×	~
Malware	Conficker, Flame	v	×	×
Command & Control Servers	C&C Security Intelligence	V	×	×
Client Applications	Firefox, IE, BitTorrent	v	×	×
Network Servers	Apache 2.3.1, IIS4	v	×	×
Operating Systems	Windows, Linux	v	×	×
Routers & Switches	Cisco, Nortel, Wireless	v	×	×
Mobile Devices	iPhone, Android, Jail	v	×	×
Printers	HP, Xerox, Canon	V	×	×
VoIP Phones	Cisco, Avaya, Polycom	v	×	×
Attualis Machines filiates. All rights reser	VMware, Xen, RHEV	~	×	× (

OpenAppID – First OSS Application and Control

- OpenAppID Language Documentation
 - Accelerate the identification and protection for new cloud-delivered applications
- Special Snort engine with OpenAppID preprocessor
 - Detect apps on network
 - o Report usage stats
 - $\circ~$ Block apps by policy
 - Snort rule language extensions to enable app specification
 - Append 'App Name' to IPS events
- Library of Open App ID Detectors
 - Over 1000 new detectors to use with Snort preprocessor
 - o Extendable sample detectors



Available now at Snort.org



The Event Horizon Problem

- Point-in-time
 - Events generated as they're discovered
 - Discovery (detection) failure = false negative
 - Brittle.
- Continuous (Telemetry)
 - Specific event types are continuously recorded and analysed
 - Structural (signatures)
 - Behavioural (activities)







Beyond The Event Horizon

- Continuous Capability is needed for the world in which you will be compromised
 - Streaming telemetry
 - Continuous analysis
 - Real-time and retrospective security with the full spectrum of controls available at any time





The Threat-Centric Model

Breach	Understand scope, contain & remediate		gine
Threat	Focus on the threat – security is about detecting, understanding, and stopping threats	S S	nation) Eng
Control	Set policy to reduce surface area of attack	AP	kflow (autor
Visibility	Broad awareness for context		Wor



Visibility Layer Concept



Control

- Control is about defining & managing the interactions between users, applications, devices, and data
- Access control & segmentation
- Policy enforcement
- Asset hardening & management
- User management





Control Layer Concept



Threat and Breach

- Detection & Response are critical functions today
- Being able to detect in a "relevant timeframe"
- Timeframe of response
 - "The Golden Hour"









Challenges

- None of this works if everything has to be there for any of it to work
- Each product must stand alone as the best in its class
- When Cisco products are brought together they gain capability through leveraging each other's visibility and control mechanisms

Our fundamental job is to reduce complexity and increase capability



Reduce Complexity and Increase Capability





Collective Security Intelligence



It Takes an Architecture

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Start with Best-of-breed Products

The **NGFW** Security Value Map shows the placement of Cisco ASA with FirePOWER Services and the FirePOWER 8350 as compared to other vendors. All three products achieved **99.2** percent in security effectiveness and now all can be confident that they will receive the best protections possible regardless of deployment. Cisco Advanced Malware Protection (**AMP**) has the lowest TCO of any product tested. It is also a a leader in security effectiveness achieving detection of **99** percent of all tested attacks AMP excelled in time-todetection, catching threats faster than competing Breach Detection Systems. Based on individual and comparative testing of vendors in the IPS market Cisco* FirePOWER **NGIPS** leads the Security Value Map and provides the best protection possible while also leading the class in total cost of ownership.

Source: Independent Competitive Testing done by NSS Labs





Superior Intelligence to Battle Advanced Threats



Enhance with Cisco Security Services





Only Cisco Delivers





Related Sessions

- BRKSEC-1030 Introduction to the Cisco Sourcefire NGIPS Gary Spiteri
- BRKSEC-2021 Firewall Architectures in the Data Centre and Internet Edge Goran Saradzic
- BRKSEC-2028 Deploying Next Generation Firewall with ASA and Firepower Services Jeff Fanelli
- BRKSEC-2044 Building an Enterprise Access Control Architecure Using ISE and TrustSec Imran Bashir
- BRKSEC-2664 Cisco Sourcefire Advanced Malware Protection (AMP) Jay Tecksingani
- BRKSEC-2690 Deploying Security Group Tags Kevin Regan
- BRKSEC-2691 Identity Based Networking: IEEE 802.1X and Beyond Hari Prasad Holla
- BRKSEC-2902 Embrace Cloud Web Security With Your Cisco Network Hideyuki Kobayashi
- BRKSEC-3770 Advanced Email Security with ESA Joe Montes
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Q&A

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Thank you.

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Session Abstract

BRKSEC-2061: Cisco + SourceFire: Threat-Centric Security Approach Jatin Sachdeva, Security Architect, Cisco ANZ

To truly protect against all possible attack vectors, IT professionals must accept the nature of modern networked environments and devices and start defending them by thinking like defenders responsible for securing their infrastructure. Critical to accomplishing this is first understanding the modern threat landscape and how a threat-centric approach to security can increase the effectiveness of threat prevention. This technical session will provide a "how to" with the Cisco Security portfolio, provide an update on the Cisco and Sourcefire security architectures and integrations, and also detail current threats based on research from Cisco's Talos Security Intelligence & Research Group. By attending this session, Security, Network and IT architects, will benefit from learning approaches that protect their environments across the attack continuum - before, during and after an attack.



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