

DEFENDING THE EXPOSED FLANK
DIGITAL SUPPLY CHAIN SECURITY

BSides Vienna 2015



Hi

I'm Dave Lewis

I was a defender for almost two decades

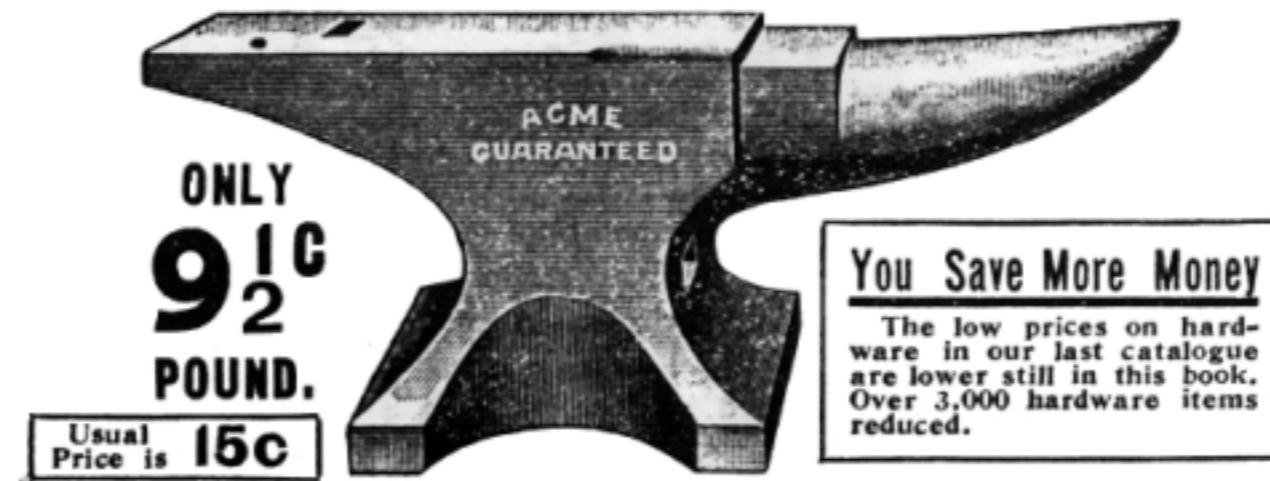
CV: ca.linkedin.com/in/gattaca/

I have the scars to prove it

ACME AMERICAN WROUGHT ANVILS

THEY RING LIKE A BELL. No anvil made, English or American, surpasses our Acme in shape, material or finish. It is solid forged of two pieces of best wrought iron, welded at waist; face is made of one piece of tool steel, electrically welded to the body and warranted not to come loose. Base has sufficient spread to insure stability and prevent tipping; has long perfectly shaped horn and heel; face is trued and shaped by a special machine so that there are no hollow or uneven places; edges are perfectly tempered and will not chip. Hardie holes are straight and true, so you will have no trouble on account of anvil tools sticking or not setting level.

WE HAVE THE EXCLUSIVE SALE OF THE ACME. We take the entire output of the factory that makes them, and get them so cheap we are enabled to sell them at a lower price than others pay for anvils not as good. We sell more anvils than any concern in the United States. We could not sell so many unless they were everything we claim for them.



WHAT HAVE I DONE LATELY?

- Contributor at Forbes
- Writer for CSO Online
- Advisory board for Sector Security Conference
- Co-Founder of OpenCERT Canada
- Founder of liquidmatrix.org
- Board of Directors for (ISC)2

Now, I work for  Akamai

A wide-angle photograph of a large stadium filled with people in blue and white uniforms, likely cadets or students, cheering and shouting. They are holding up their hats and hands in the air. The stadium is packed, and the sky is clear and blue.

SAFE TO SAY

I'M PRETTY HAPPY ABOUT THAT

This isn't a vendor pitch

MONTEGO

F

Stiege
Hörsa



BSidesVienna

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I'm here to talk about the exposed flank

Digital Supply Chain Security

LEVEL SETTING

- I have merely lived it for the last 20 years or so.
- I'm here to share my perspectives and lessons learned.
- A collection of my experiences that I hope may provide you with value and actionable items.

ACT 1

MEANING



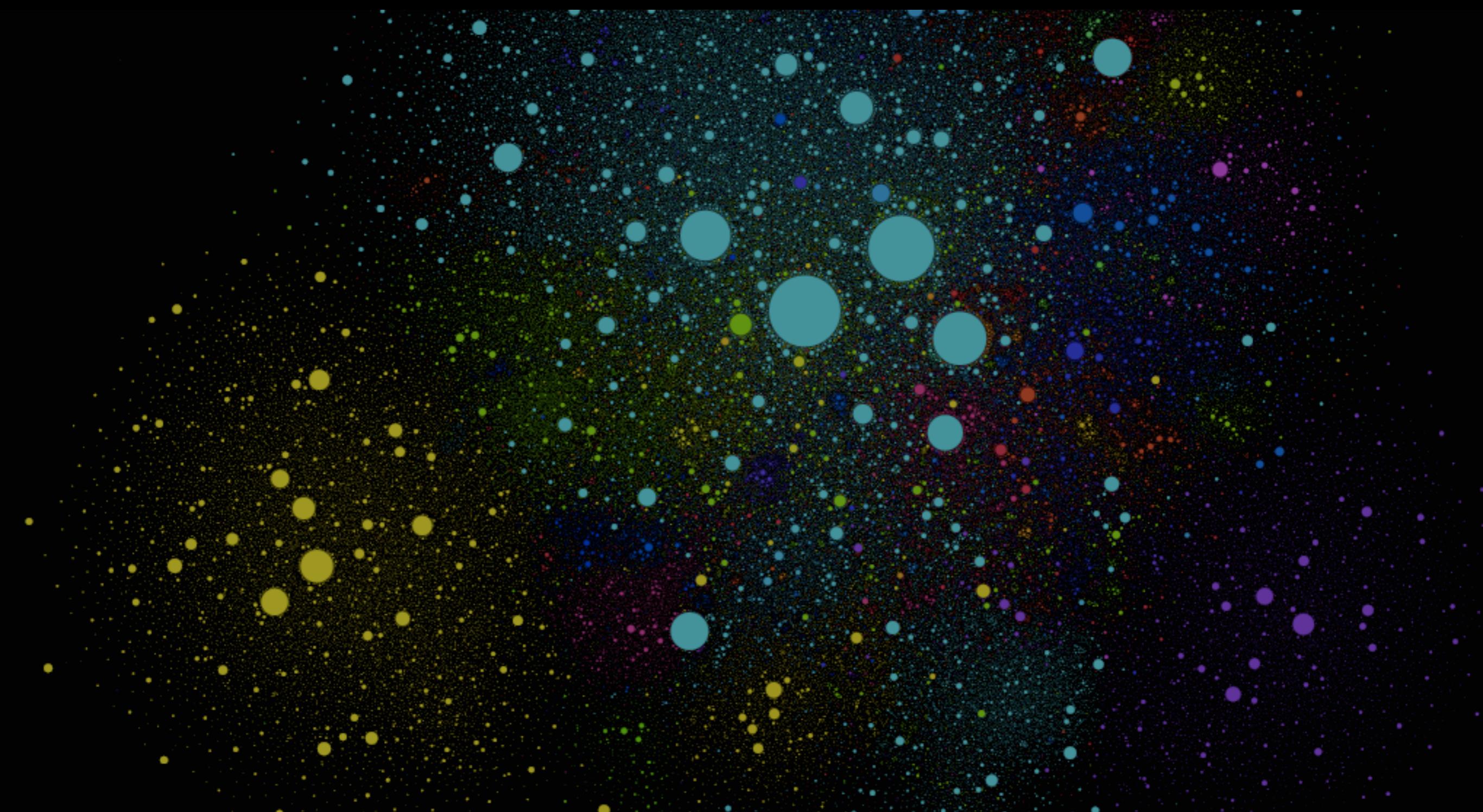
WHY I'M INTERESTED

- When I was young I would hear tales of my grandfathers crossing the Atlantic during WWII.
- One grandfather was delivering goods in the merchant marine.
- One grandfather was defending the convoys in the Canadian Navy.
- I learned the perspectives of the attackers and the defenders and the associated cost.
- Thus my fascination with supply chain security began.

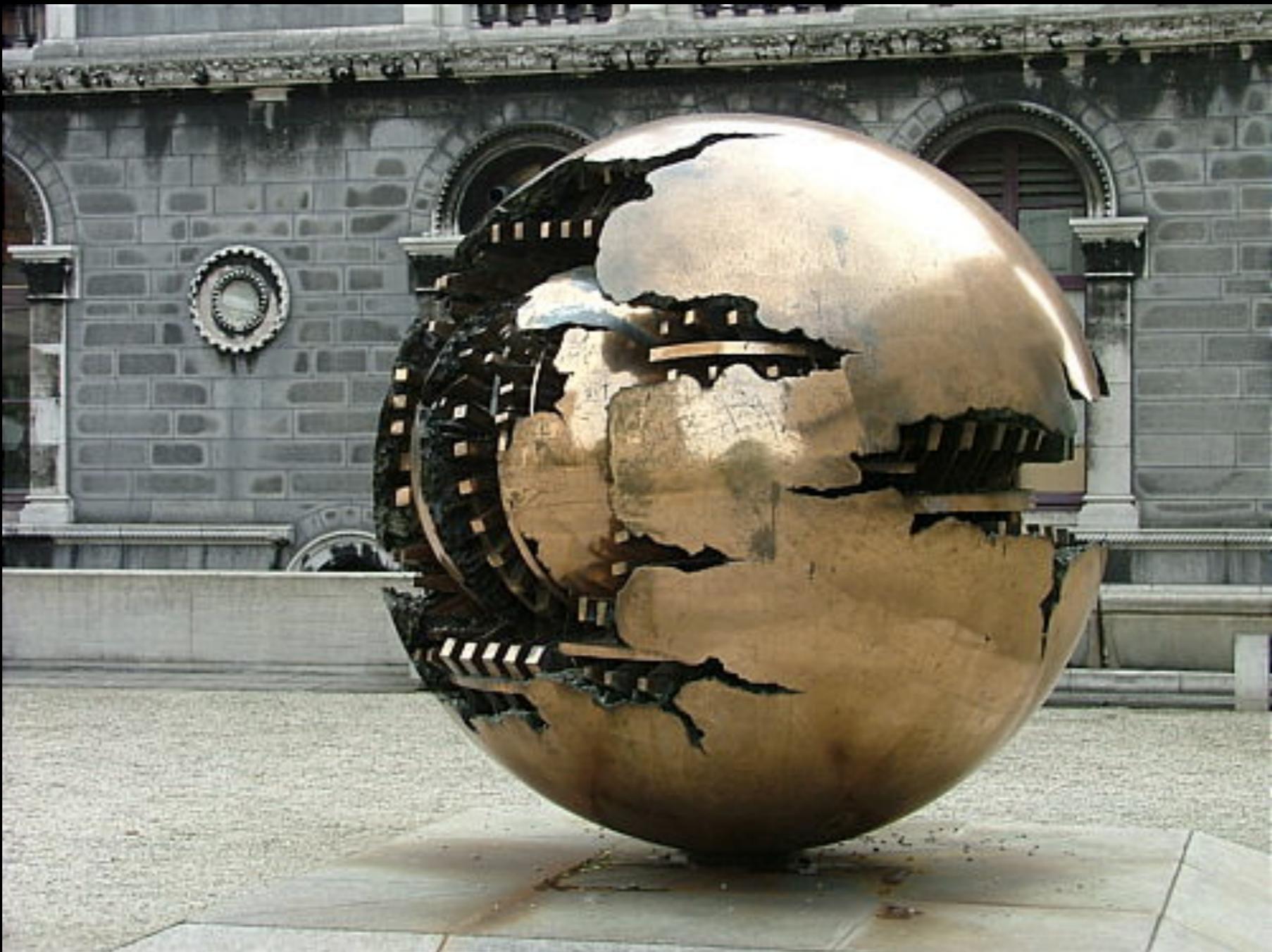
PHYSICAL SUPPLY CHAIN



DIGITAL SUPPLY CHAIN



ONE & A HALF YEARS LATER...



WHAT DO I MEAN?

- Supply chain in this perspective is the managing of the internal components of an organization.
- The security to ensure the integrity of the information technology systems.
- Addressing security at all points in the workflow so that attackers may not openly compromise systems.
- Attackers might have been focused on stealing trucks historically, now they're after your code.

WHO ELSE IS TALKING ABOUT THIS?



EXAMPLE OF A DIGITAL PICTURE FRAME OR USB DRIVE HOW DID MY WIDGET GET HERE?

```
All processors have done init_idle
ACPI: Subsystem revision 20040326
ACPI: Interpreter disabled.
PCI: PCI BIOS revision 2.10 entry at 0xfd9f3, last bus=1
PCI: Using configuration type 1
PCI: Probing PCI hardware
PCI: Probing PCI hardware (bus 00)
PCI: Discovered primary peer bus ff [IRQ]
PCI: Using IRQ router PIIX/ICH [6006/7110] at 00:07.0
PCI: Found IRQ 11 for device 00:04.0
PCI: Sharing IRQ 11 with 00:04.1
Limiting direct PCI/PCI transfers.
isapnp: Scanning for PnP cards...
isapnp: No Plug & Play device found
Linux NET4.0 for Linux 2.4
Based upon Swansea University Computer Society NET3.039
Initializing RT netlink socket
Starting kswapd
UFS: Disk quotas vquot_6.5.1
vesafb: framebuffer at 0xfd000000, mapped to 0xc880d000, size 2496k
vesafb: mode is 1024x768x16, linelength=2048, pages=0
vesafb: protected mode interface info at c000:a440
vesafb: scrolling: redraw
vesafb: directcolor: size=0:5:6:5, shift=0:11:5:0
Console: switching to colour frame buffer device 128x48
fb0: UESA VGA frame buffer device
Detected PS/2 Mouse Port.
pty: 256 Unix98 ptys configured
Floppy drive(s): fd0 is 1.44M
floppy0: no floppy controllers found
RAMDISK driver initialized: 16 RAM disks of 4096K size 1024 blocksize
Uniform Multi-Platform E-IDE driver Revision: 7.00beta4-2.4
ide: Assuming 33MHz system bus speed for PIO modes; override with idebus=xx
PIIX4: IDE controller at PCI slot 00:07.1
PIIX4: chipset revision 1
PIIX4: not 100% native mode: will probe irqs later
ide0: BM-DMA at 0xfcfd0-0xfcfd7, BIOS settings: hda:DMA, hdb:pio
ide1: BM-DMA at 0xfcfd8-0xfcfdff, BIOS settings: hdc:pio, hdd:pio
hda: HITACHI_DK2Z7n-41, ATA DISK drive
```

MALWARE IN THE PIPELINE...



WIRED BY DE

[DISCOVER NOW ▶](#)**REAT LEVEL****hacks and cracks**

Digital Photo Frames and Other Gadgets Infected with Malware

KIM ZETTER 01.31.08 2:55 PM

The SANS Internet Storm Center has been conducting an informal survey of commercial gadgets that customers bought that contained ready loaded malware. The list is small growing as people contribute to it with their own reports of gadgets that may have been infected at some point in the supply chain.



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<https://bsidesvienna.at/>

PLUG

+5V

-

R1
R2

THE GROUND FLOOR

- The focus in supply chain security has historically been towards enhancing the physical security of the supply chain logistics.
- Lack of concentration on the information technology/security
- Greater move to decentralized information technology solutions with global scale
- Information technology and the supply chain

WHO CARES?

- Who is taking the time to work on the problem?
- Organization that on supply chain include:
- World Customs Organization (WCO), Customs Trade Partnership against Terrorism (C-TPAT), Container Security Initiative(CSI) from the US Customs and Border Protection and the Global Security Initiative from DHS.
- ISO/PAS 28000 “Specification for security management systems for the supply chain”

**INTERNATIONAL
STANDARD**

**ISO
28000**

First edition
2007-09-15

**Specification for security management
systems for the supply chain**

*Spécifications pour les systèmes de management de la sûreté pour la
chaîne d'approvisionnement*

ISO 28000:2007

- ISO 28000:2007 specifies the requirements for a security management system, including those aspects critical to security assurance of the supply chain.
- Security management is linked to many other aspects of business management. Aspects include all activities controlled or influenced by organizations that impact on supply chain security.
- These other aspects should be considered directly, where and when they have an impact on security management, including transporting these goods along the supply chain.

ISO 28000 HIGHLIGHTS

- Establish, implement, maintain and improve a security management system
- Assure conformance with stated security management policy
- Demonstrate such conformance to others
- Seek certification/registration of its security management system by an Accredited third party Certification Body; or
- Make a self-determination and self-declaration of conformance with ISO 28000:2007

OUR FLANK? WHAT FLANK?

THE MAGINOT LINE



MAGINOT LINE

- There is a concerted effort to secure physical side of logistics.
- IT solutions as they relate to supply chain have typically lacked the same focus.
- So why should this be of concern?
- Well...

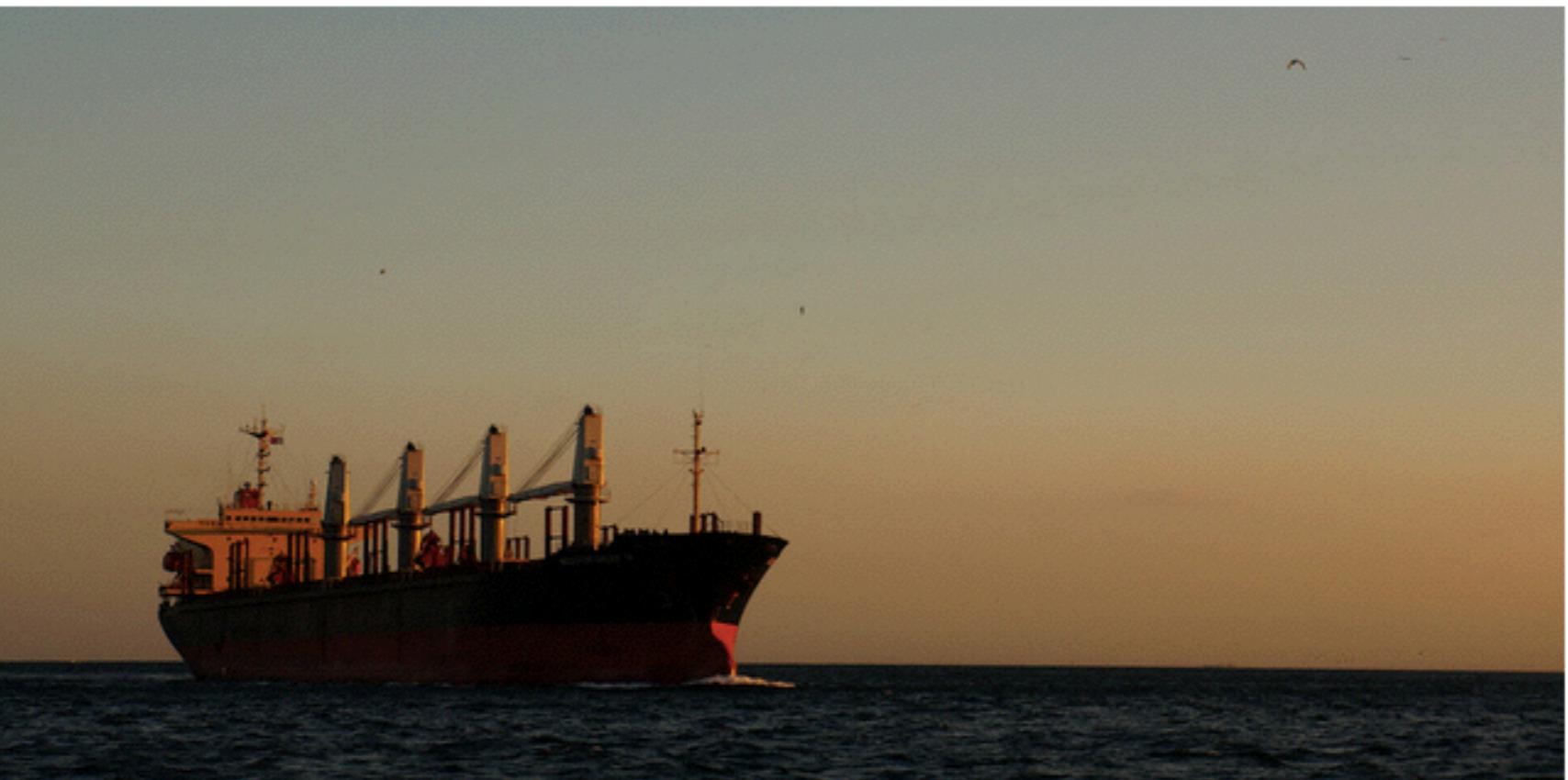
CASE IN POINT...

 NEWS

An Iranian Oil Tanker Hacked Its Own Tracking System To Avoid Detection

ADAM CLARK ESTES 31 OCTOBER 2013 3:30 PM

 Share 16  Discuss 10  Bookmark



WHAT COULD GO WRONG?



...OR THIS?



WAR STORIES AND SUCH

ACT II



WAR STORY

- External Penetration Test
- Partner connections to \$MyDayJob were all tested.
- Testers were able to gain access to \$MyDayJob network
- username: \$vendor, password: <blank>



WHAT WENT WRONG

- Default configurations in place
- No verification of the security controls in place
- No active testing of partner connections
- No contractual language pertaining to third party connections

GLOBAL, LEGAL, COMPLEXITY, HUMAN...

CHALLENGES & COMPLICATIONS



CHALLENGES

- As we have more and more products delivered to us faster and cheaper the scale of operations has gone to go global scale.
- What are some impacts of this move?
 - Outsourced help desk
 - Offshore development centres
 - Partner networks

GEOPOLITICAL



LEGAL ISSUES

- Legal issues are now global ones as supply chain expands across the globe.
- How do laws affect the production supply chain?
- Is there a lack of enforcement of said laws?
- Are you even legally able to be operating in the country?
- Ignorance of the law is no defense.

I DON'T WANT TO POINT FINGERS
BUT...



Gabriel Austin

BLUE COAT & SYRIA

- “U.S. Firm Acknowledges Syria Uses Its Gear to Block Web” Wall Street Journal (<http://online.wsj.com/news/articles/SB10001424052970203687504577001911398596328>)
- “Update On Blue Coat Devices In Syria” Bluecoat (<http://www.bluecoat.com/company/news/update-blue-coat-devices-syria>)
- “Blue Coat Partner Fined \$2.8m Over Syria Surveillance Sales” TechWeek EU (<http://www.techweekeurope.co.uk/news/blue-coat-partner-fined-surveillance-syria-114548>)
- Exposed by hacktivists. Admitted failure. Fines applied.

ATM, FAVORITE OF NE'ER DO WELLS



ANOTHER LEGAL ISSUE EXAMPLE, ATM FRAUD

In Hours, Thieves Took \$45 Million in A.T.M. Scheme

By MARC SANTORA

Published: May 9, 2013

It was a brazen bank heist, but a 21st-century version in which the criminals never wore ski masks, threatened a teller or set foot in a vault.

Enlarge This Image



United States attorney's office, Eastern District of New York

Elvis Rafael Rodriguez, left, and Emir Yasser Yeje, two of those charged in Brooklyn on Thursday, posed in March with approximately \$40,000 in cash that the authorities say they were laundering.

In two precision operations that involved people in more than two dozen countries acting in close coordination and with surgical precision, thieves stole \$45 million from thousands of A.T.M.'s in a matter of hours.

In New York City alone, the thieves responsible for A.T.M. withdrawals struck 2,904 machines over 10 hours starting on Feb. 19, withdrawing \$2.4 million.

The operation included sophisticated computer experts operating in the shadowy world of Internet hacking, manipulating financial information with the stroke of a few keys, as well as common street criminals, who used that information to loot the automated teller machines.

 FACEBOOK

 TWITTER

 GOOGLE+

 SAVE

 EMAIL

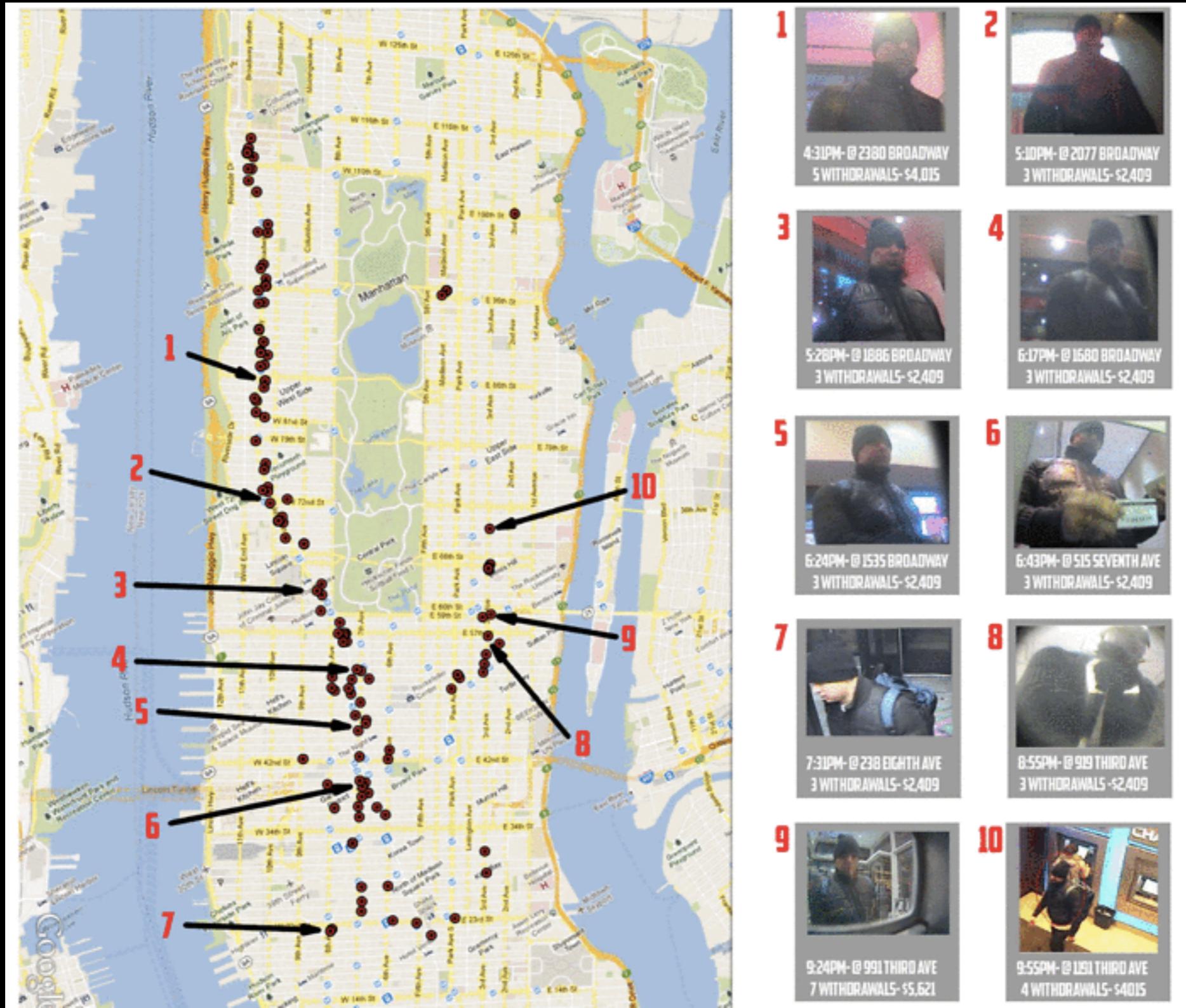
 SHARE

 PRINT

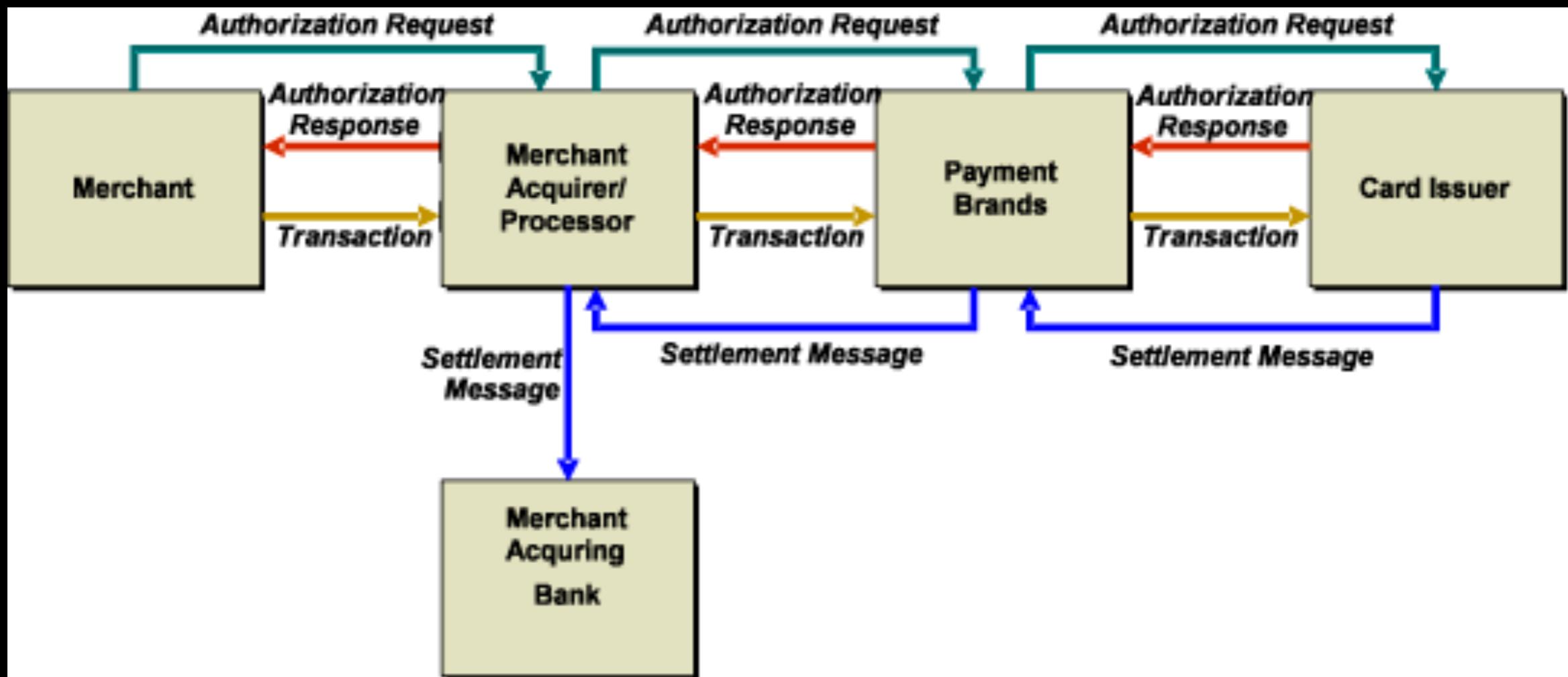
 REPRINTS

BELLE
GET TICKETS

IT WAS QUICK



THE FLOW



WHAT WENT WRONG?

- Vulnerable financial institutions
- Credit card processor was breached on two occasions
- Withdrawal limits removed on prepaid debit cards
- Cashing teams: 36,000 transactions and withdrew about \$40 million from machines in the various countries in about 10 hours

INTELLECTUAL PROPERTY

- We have all read about the APT problems.
- Concerted efforts to purloin Intellectual Property. (Source Code, Process, Secret Sauce)
- Using tools like Perforce and Git (as examples) partners often want access to source code.
- Too often they get this access as a “business decision” which is your organization’s secret sauce.

SNIPS IN THE WIRE

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SECURITY

Symantec source code leak becomes torrent

'In the name of god! You are killing our CPUs'

By John Leyden, 26th September 2012 [Follow](#) 2,064 followers



22

5 ways to reduce advertising network latency

Hactivists once again poked fun at Symantec after previously leaked source code for Symantec's Norton Utilities 2006 software was made available as a torrent on Monday. Symantec downplayed the significance of the leak, saying it only involved obsolete code that had already been exposed.

Bags are packed: A Symantec boss is coming to AntiSec tacked a mocking note onto the release of a 52MB file, which was uploaded to The Pirate Bay and other torrent tracker sites on Monday. "Anyhow with this

SOURCE CODE ISSUES

Security Advisories Relating to Symantec Products - Symantec Reporting Server Improper URL Handling Exposure

SYM09-008

April 28, 2009

Revision History

None

Risk Impact

Low

Remote Access	No
Local Access	Yes
Authentication Required	No
Exploit available	No

Overview

The login web page in some versions of Symantec Reporting Server contains a URL handling error which could potentially allow an attacker to launch a phishing attack.

Affected Products

Product	Affected Version	Solution
Symantec AntiVirus Corporate Edition	10.1 MR7 and earlier	Update to 10.1 MR8 or later
	10.2 MR1 and earlier	Update to 10.2 MR2 or later
Symantec Client Security	3.1 MR7 and earlier	Update to 3.1 MR8 or later
Symantec Endpoint Protection	11.0 MR1 and earlier	Update to 11.0 MR2 or later

Unaffected Products

Product	Version
None	All

Security Response Blog

Stay on top of Internet security trends

[Learn More ▶](#)

The Symantec Intelligence Report

Monthly report concerning malware, spam and other threats.

[More info ▶](#)



...AND SO ON

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 **SALTED HASH-TOP SECURITY NEWS**
By [Steve Ragan](#) | [Follow](#)

NEWS
Bitly discloses account compromise, urges users to change passwords

PARTNER NETWORKS

- Many manufacturing companies build and maintain interconnected networks
- The “I have a firewall so I’m OK” mentality should be shelved.
- Do you check your third party connections?
- Trust But (Test and) Verify

WAR STORY

- Magical Support Elves on outsourced software development contract
- Remote access via VPN and RSA tokens for authentication
- Faster than a speeding developer...



THE LOGINS

Chennai - 6:43 pm

Hyderabad - 6:52 pm

Mumbai - 7:09 pm

Goa - 7:22 pm

Pune - 7:41 pm

Bangalore - 7:55 pm



SPACE & TIME

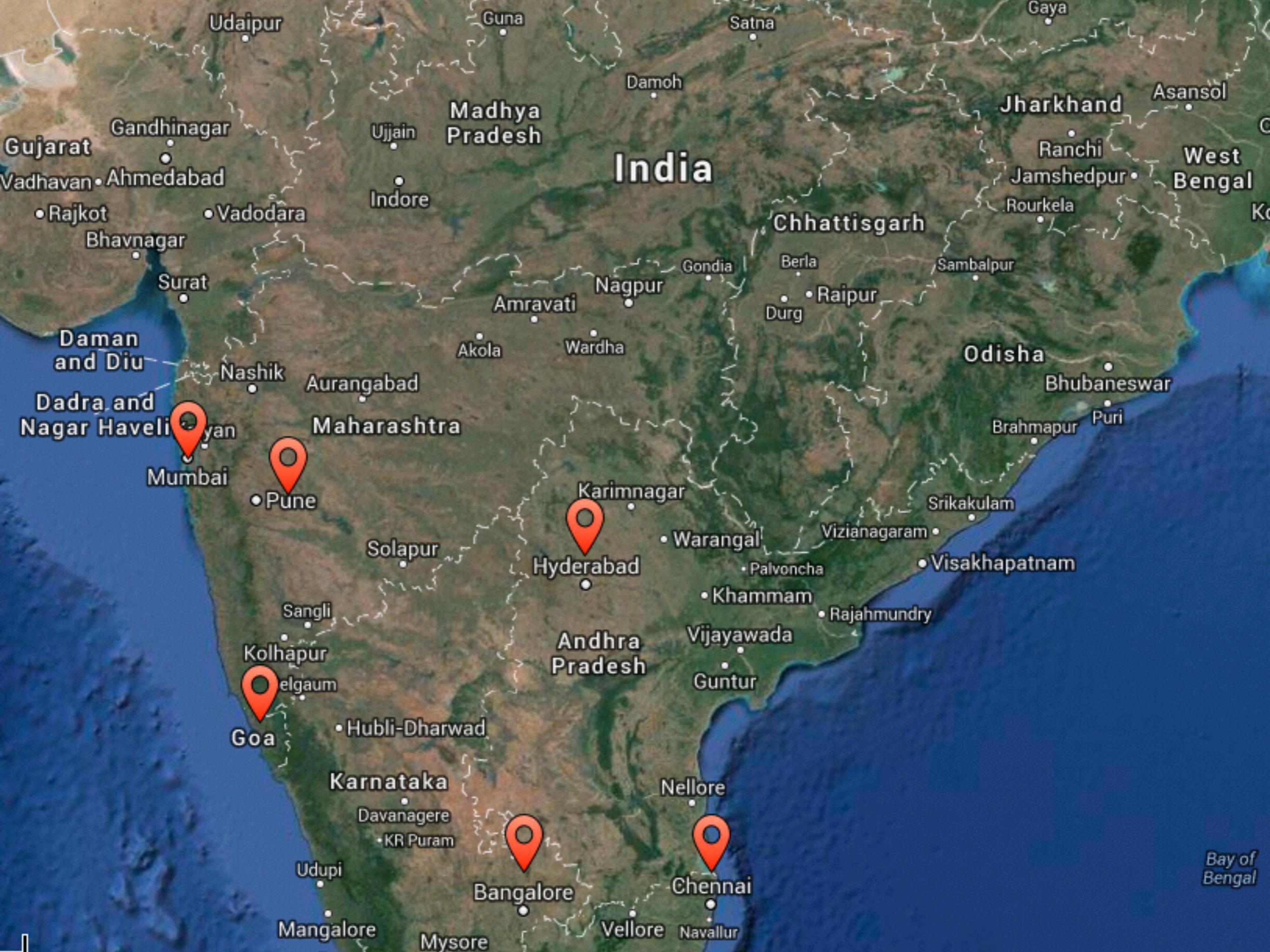
Chennai – Hyderabad = 633 km journey of 9 hours 36 min, in 9 min

Hyderabad – Mumbai = 708 km journey of 11 hrs 12 min, in 11 min

Mumbai – Goa = 604 km journey of 9 hrs and 28 min, in 13 min

Goa – Pune = 457 km journey of 7 hrs and 33 min, in 18 min

Pune – Bangalore = 836 km journey of 11 hrs and 20 min...in 14 minutes.



THE CATCH

- What was the common theme between these contractors?
- They all used the **SAME** login



WHAT WENT WRONG

- Contractors were not clearly trained regarding security awareness
- Contractors shared the same login credentials
- Active monitoring was not in place
- The company did not see fit to penalize the contractor as it would have negatively affected renewal negotiations.

We weren't tackling the basics well.

We Failed

HARDWARE TROJANS

The screenshot shows a news article from Computerworld. At the top, there's a navigation bar with links for White Papers, Webcasts, Newsletters, Research, and more. Below that is a secondary navigation bar with Topics, News, In Depth, Reviews, Blogs, Opinion, and Share buttons. The main menu includes Hardware, Computer Peripherals, Laptops, Macintosh, Netbooks, PCs, and Processors. A banner for a Salary Survey 2014 is visible. The article title is "Security researchers create undetectable hardware trojans". It discusses how researchers can weaken hardware random number generators used for encryption. The author is Jaikumar Vijayan, and it was published on September 17, 2013, at 04:15 PM ET. There are 7 comments. The article summary explains that a team of security researchers from the U.S. and Europe has released a paper showing how integrated circuits can be maliciously compromised during manufacturing through undetectable changes at the transistor level. The full article continues below the summary.

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News

Security researchers create undetectable hardware trojans

Method can be used to weaken hardware random number generators used for encryption

By [Jaikumar Vijayan](#)

September 17, 2013 04:15 PM ET [7 Comments](#)

Share 17 Like 110 More

Computerworld - A team of security researchers from the U.S. and Europe has released a paper showing how integrated circuits used in computers, military equipment and other critical systems can be maliciously compromised during the manufacturing process through virtually undetectable changes at the transistor level.

As proof of the effectiveness of the approach, the paper describes how the

MORE RECENTLY...



BATTLEFIELD ROBOTS

The screenshot shows a news article from Computerworld. At the top, there's a yellow header bar with the Computerworld logo and navigation links for White Papers, Webcasts, Newsletters, Research, and more. Below the header is a dark navigation bar with tabs for Topics, News, In Depth, Reviews, Blogs, Opinion, and Shark. The main content area has a sidebar for Applications (with sub-links for App Development, Big Data, Business Intelligence/Analytics, Content/Docu, Emerging Technologies, Enterprise Architecture, ERP, Open Source, Reg, and Unified Communications) and a main column for News. A red banner at the top of the main column reads "SALARY SURVEY 2014". The main headline is "U.S. military may have 10 robots per soldier by 2023". The article summary states: "Military expects to soon be using autonomous robots to carry soldiers' gear and scan for enemy combatants". It's written by Sharon Gaudin on November 14, 2013, at 05:32 PM ET, with 4 comments. Below the article are social sharing buttons for LinkedIn, Twitter, Google+, StumbleUpon, Facebook, and Email, along with a "More" button. A summary of the article is provided at the bottom.

White Papers Webcasts Newsletters Research

Topics ▾ News In Depth Reviews Blogs ▾ Opinion Shark

Applications

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Emerging Technologies | Enterprise Architecture | ERP | Open Source | Reg
Unified Communications

SALARY SURVEY 2014 Ur IT Salary Survey today and enter a drawing for 1 of 3 American Express gift cards

Home > Applications > Emerging Technologies

News

U.S. military may have 10 robots per soldier by 2023

Military expects to soon be using autonomous robots to carry soldiers' gear and scan for enemy combatants

By [Sharon Gaudin](#)

November 14, 2013 05:32 PM ET [4 Comments](#)

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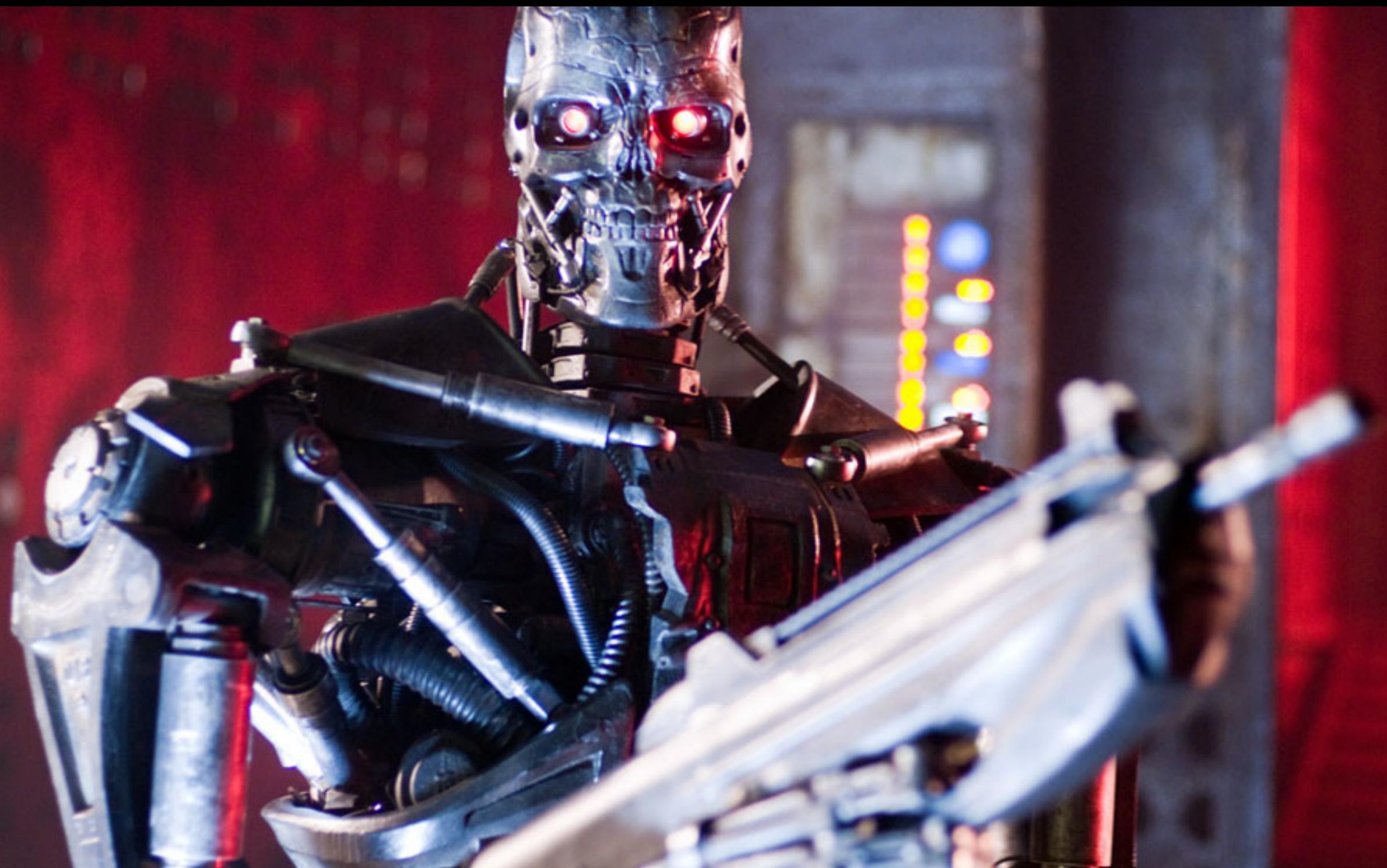
Computerworld - American soldiers patrolling dangerous streets will soon be accompanied by [autonomous robots](#) programmed to scan the area with thermal imaging and send live images back to the command center.

Likewise, squads of infantrymen hiking through mountains will be helped by

OH...RIGHT

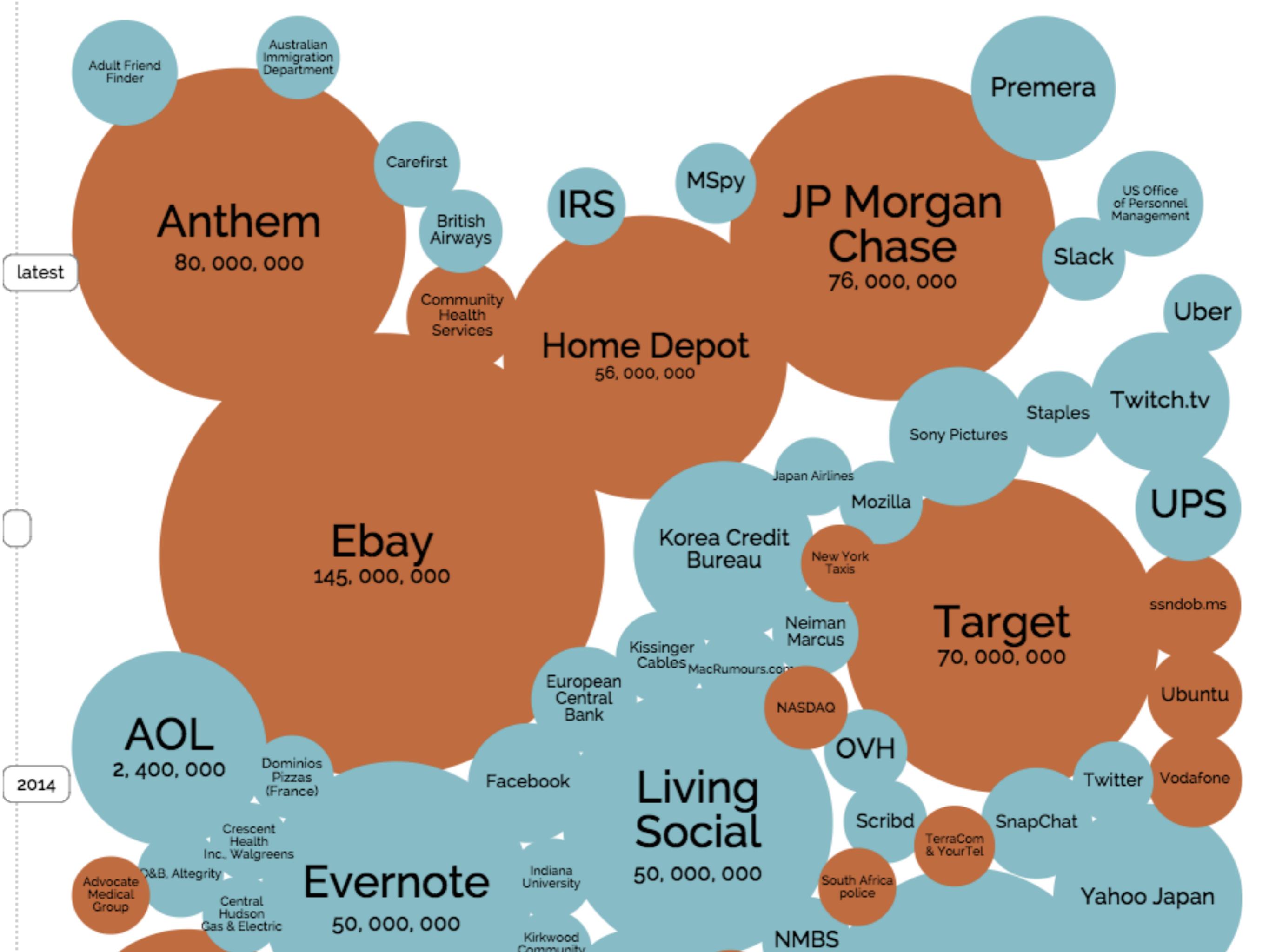


YIPES!



MORE RECENTLY
HOME DEPOT, TARGET, GOOD WILL





WHERE TO FROM HERE?

ACT III



GO BEYOND COMPLIANCE

- Compliance regimes are to address the BARE MINIMUM

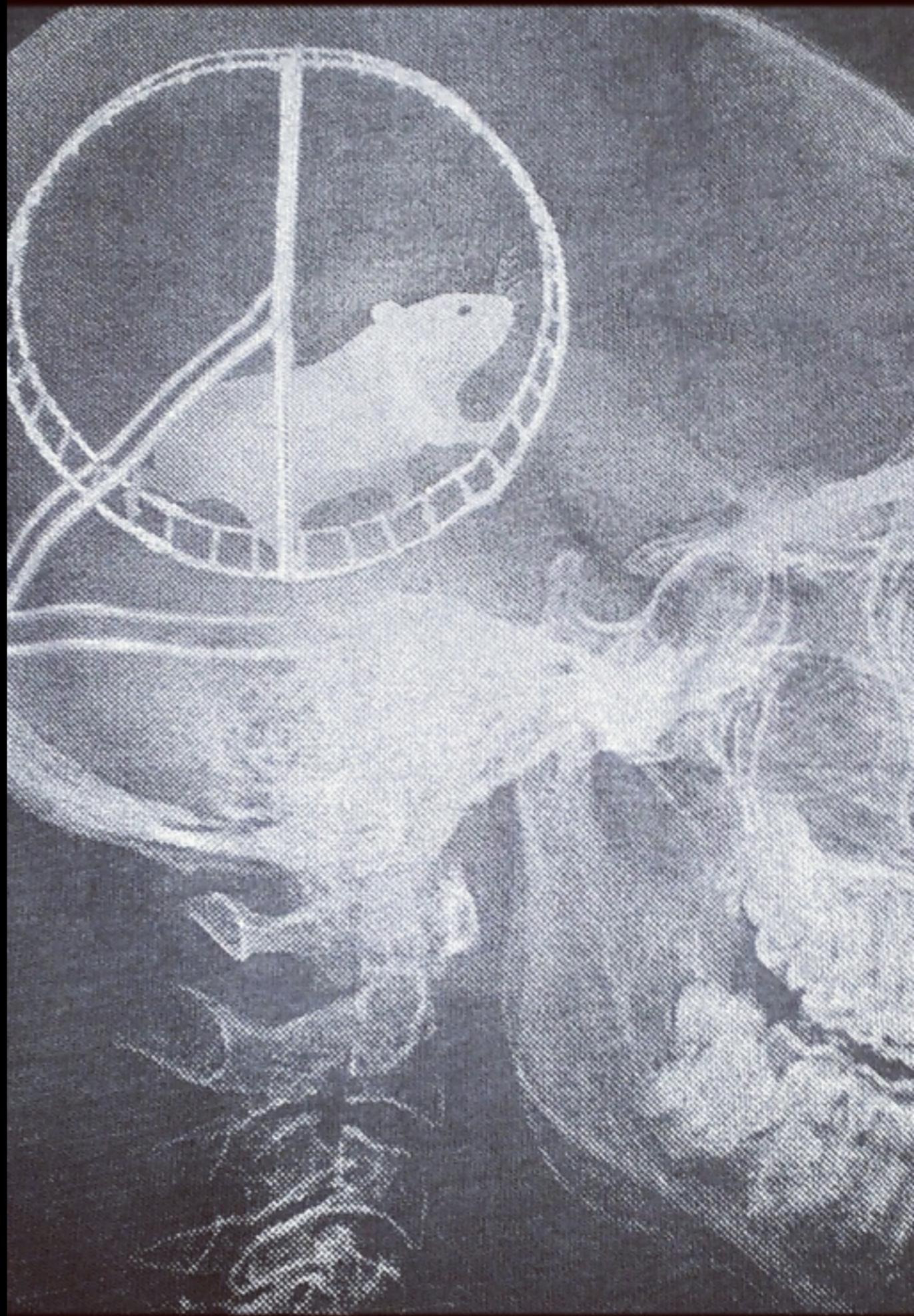


OFF SHORE DEVELOPMENT

- Greater diligence is required when signing a contract
- The lowest bid is not always the best choice
- Ensure that you're development partner adheres to your security requirements
- Make sure that they do not have offices in restricted countries
- Software liability?

HAMSTER WHEEL OF PAIN

- How do we get off this wheel of security issues?
- We need to be able to reproduce good results



DEFINED REPEATABLE PROCESSES

- There needs to be a concentration on defined repeatable processes
- Too often companies treat third party connections as one offs. (not for all of course)
- Not having a defined on-boarding process for partners can result in unintended consequences.

19 September 2014 07:47

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As a little patriotic inspiration for the newly independent country, take a peek at our selection of blue, Saltire-inspired products below.



£499

Garston Love Seat



£159

Ryker Rug

THE BUDGET BATTLE

- The hardest battle I have ever fought has been for budget
- At one org it was a perpetual game of keep away.
- You need to make a strong case that articulates the risks to the business in terms that the business can understand.
- Avoid the fear, uncertainty and doubt if at all possible.



SUCCESS

It can lead to fail

INTERNAL APPLICATIONS

- Conduct code reviews.
Go beyond unit tests.
- Hire third party
companies to review
code.
- Keep documentation
current



INFRASTRUCTURE, DNS & WEB APPLICATIONS

- You have limited resources
- Concentrate on the items that are important in your supply chain
- Have a trusted partner



BUILD TO FAIL

- As with any IT implementation failure will come
- Make your applications/infrastructure resilient
- Don't build for five nines
- Build to fail



BAMBOO ANALOGY

- Supply chain has many points that can be exploited along the way
- It is important to have a supply chain that can adapt



Thank for listening
Thanks to BSides Vienna!

Thank You

Dave Lewis
Global Security Advocate



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