DC Phone Home

Defcon, Las Vegas 2002

Chris Davis, CISSP

RedSiren

Reston, VA

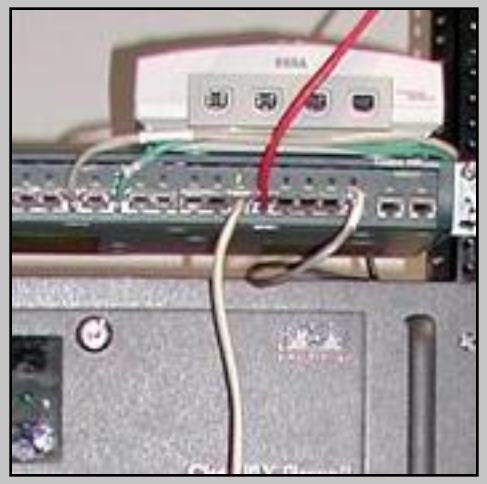
Aaron Higbee, CISSP

Foundstone

Washington DC

Overview

- 180-Degree Hacking
  - Phone Home
- Developed Platforms
  - Sega Dreamcast
  - Compaq iPAQ
  - x86 Bootable CD
- Demonstrations
- Remedies



www.dcphonehome.com

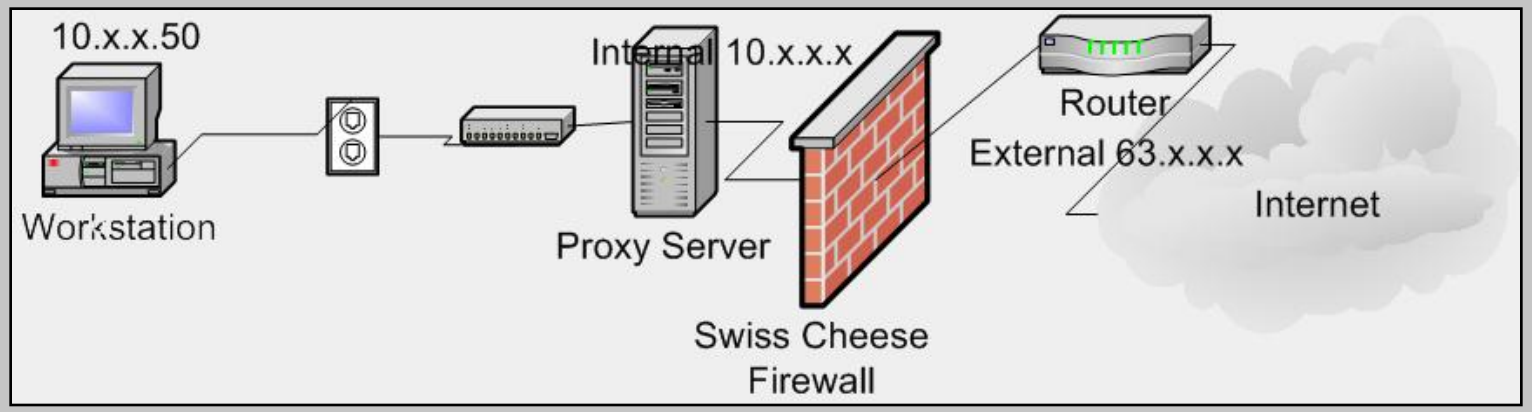
- This Presentation
- Sega Dreamcast Distribution
- iPAQ Distribution
- x86 Bootable CD-Rom

Assumptions

- Linux
- General Computer Architecture
- TCP/IP
- General Information Security Concepts
- Firewalls / NAT / Private Addressing
- VPN's
- Proxies
- Common haxOr toolz

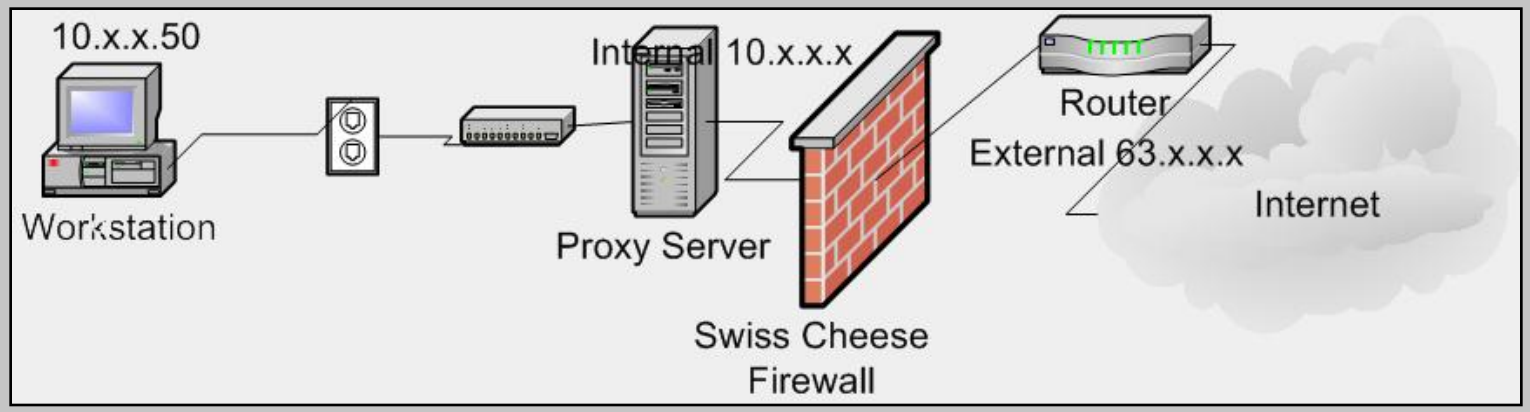
Conventional Enterprise Security

- Firewall
- Network Address Translation
- Private Addressing – RFC1918
- DMZ



Higher End Enterprise Security

- IDS (managed?)
- VPNs, Remote Access
  - Strong Authentication
- Proxies, URL filtering
- Content-checking (email virus)
- Security Personnel
- Security Consulting



Hard Crunchy Outside

Soft CHEWY Center



The Problem

- Networks go both ways: in *and* out
- The focus is on perimeter network security instead of the data contained within
- Even hackers are focused on the perimeter instead of the data
  - Apache
  - OpenSSH

Firewalls

- What *can* they do?
  - Enforcing inbound connection policies
  - DMZ
  - NAT
  - Authentication
  - VPN Gateways for remote users
  - Restricting *some* outbound traffic





Proxies

- Used to enhance network performance
- Limited content-checking features
- Mostly have to allow outbound tcp/80
  - Soap
  - DAV
  - HTTP-U
  - 30+ in development

Network Intrusion Detection

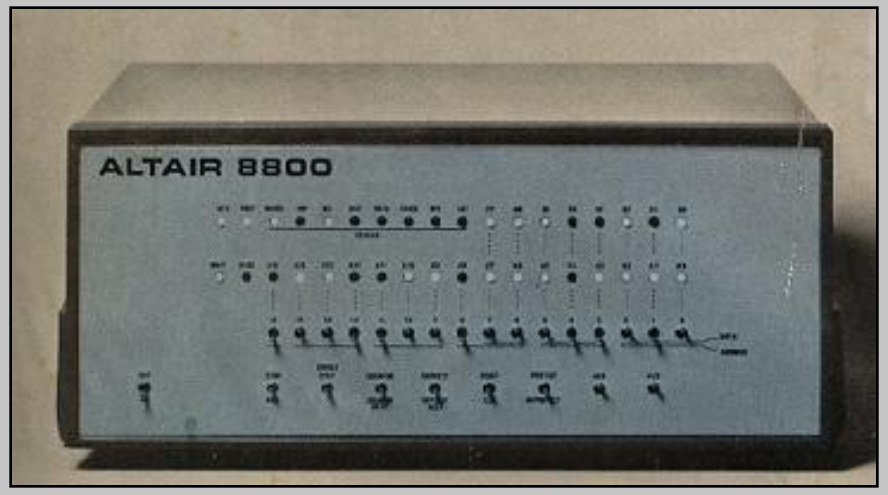
- Exists to help identify and respond to hack attempts in a timely manner
  - Mostly focused on listening for incoming attacks
- Signature-based detection
  - Must be aware of particular attack to identify it
  - Anomaly protocol detection only detects anomalies
    - WTF is that!?

The Soft Chewy Center

- Outbound connections are believed to be initiated by employees
- Companies need their employees to use the Internet
- Physical security is ‘good enough’
- Outside = Bad, Inside = Good

The “Computer” Concept

- Fits on a desk or in your lap
- Runs Windows



- WRONG!
  - A “Computer” is a general purpose architecture
    - Tivo
    - Cell Phones
    - Printers
    - Cable Boxes
    - Printers
    - Copiers
    - Game Consoles
    - Vending Machines

180-Degree Hacking

- Why hack the network? Bring it home!
- Based on the following principles
  - FIREWALLS ARE POINTLESS
  - Delivery
    - Physical access
    - Zero-day sploit
  - The Internet
  - Stupid user tricks

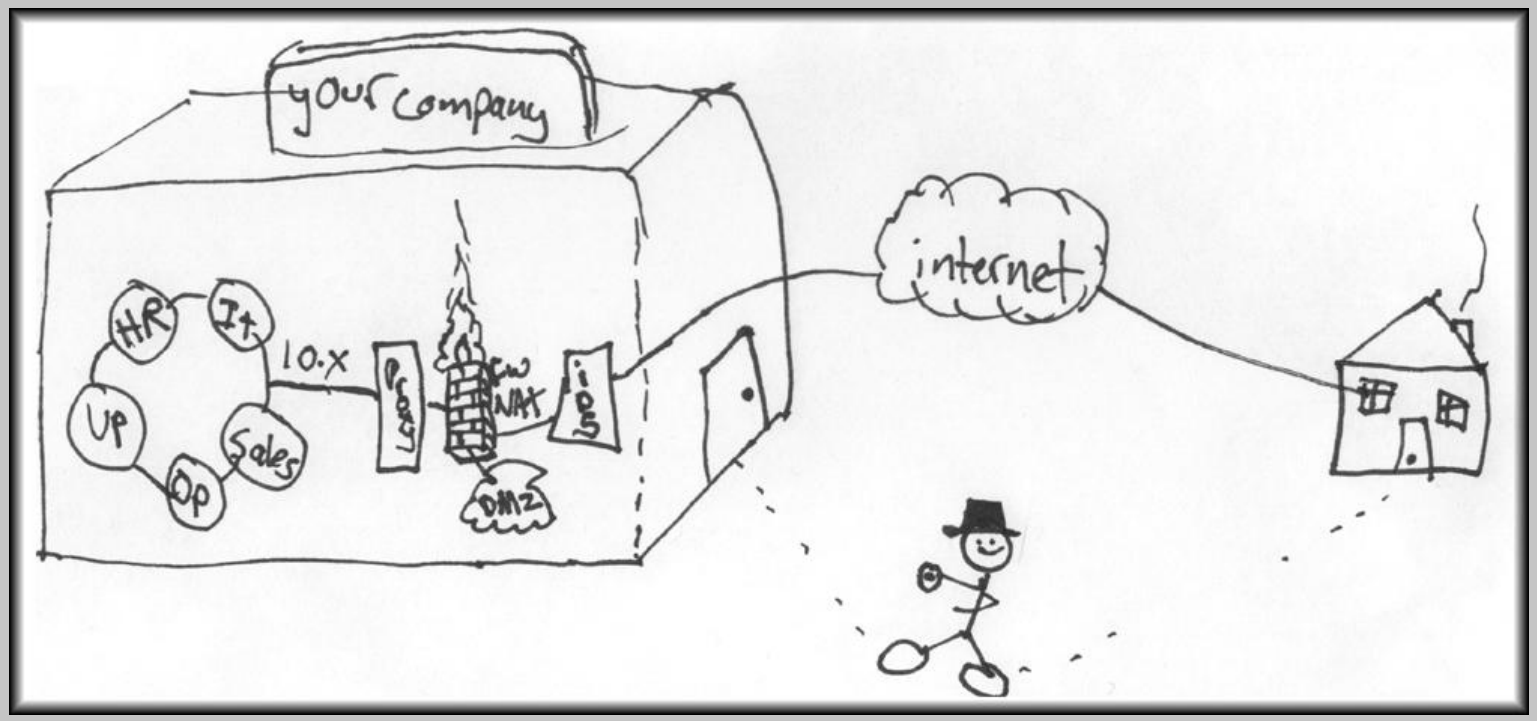
Firewalls Are Worthless

- In 180-degree hacking, firewalls are transparent
  - Data is tunneled through an authorized protocol or via encrypted transport
  - Firewalls are two-way
  - They can't block ALL traffic

Physical Access

- Physical access is trivial to obtain (seriously)
  - Especially for short periods of time [5 min]
- Creativity and planning is the only limiting factor

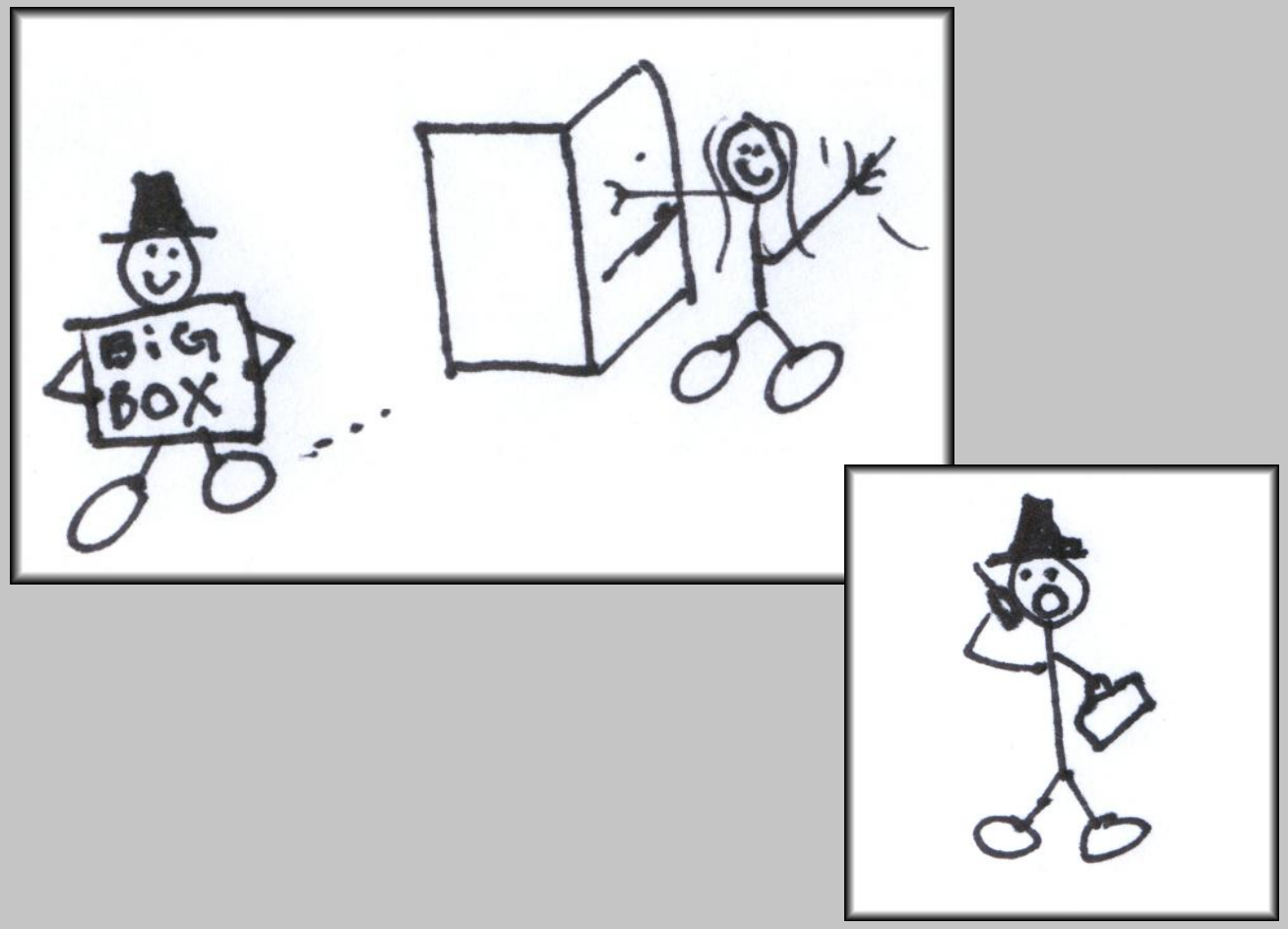
Super Stealth Method



Creativity Continued…

The Smoke Screen

Piggy Back



0-day sploit

- Same-ole Same-ole
- Boring
- Anybody, and Everybody
  - Apache
  - Openssh
- BNC and dDoS… is the best you can do!? Get Creative!

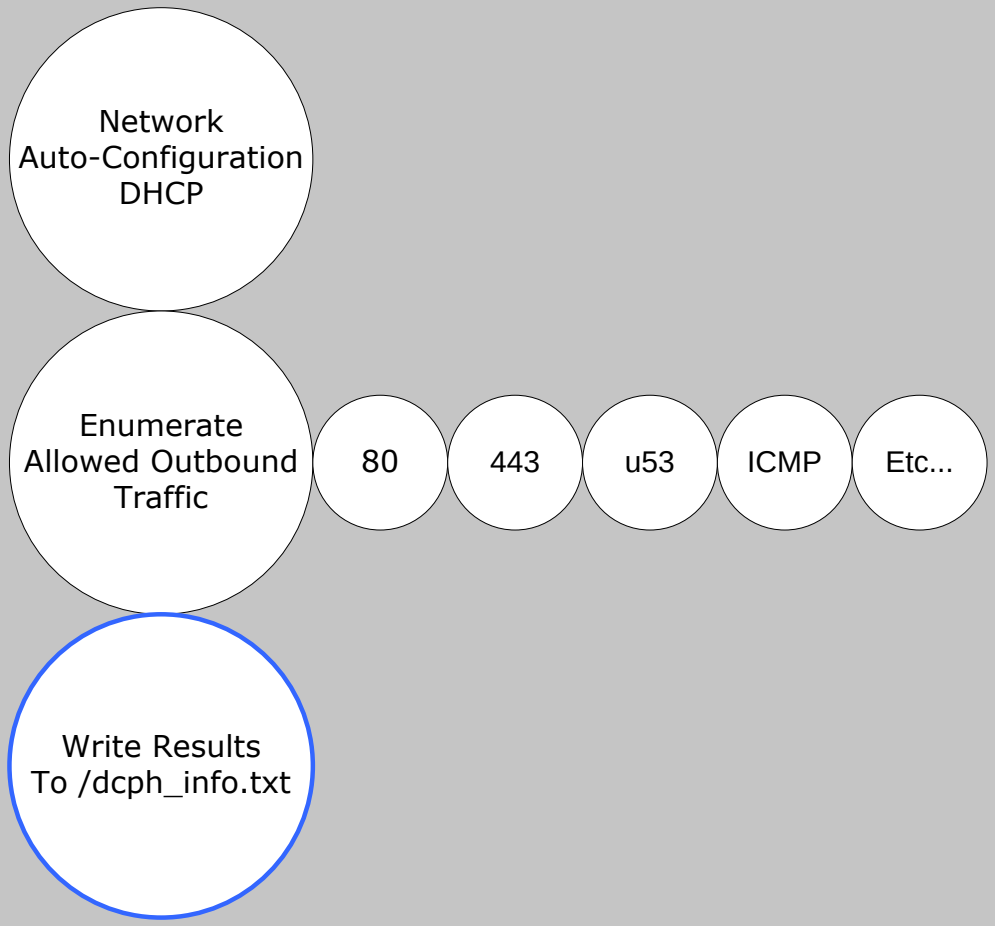
180-Degree Hacking: Post-Delivery

- Discover network
- Enumerate outbound traffic
- Phone Home

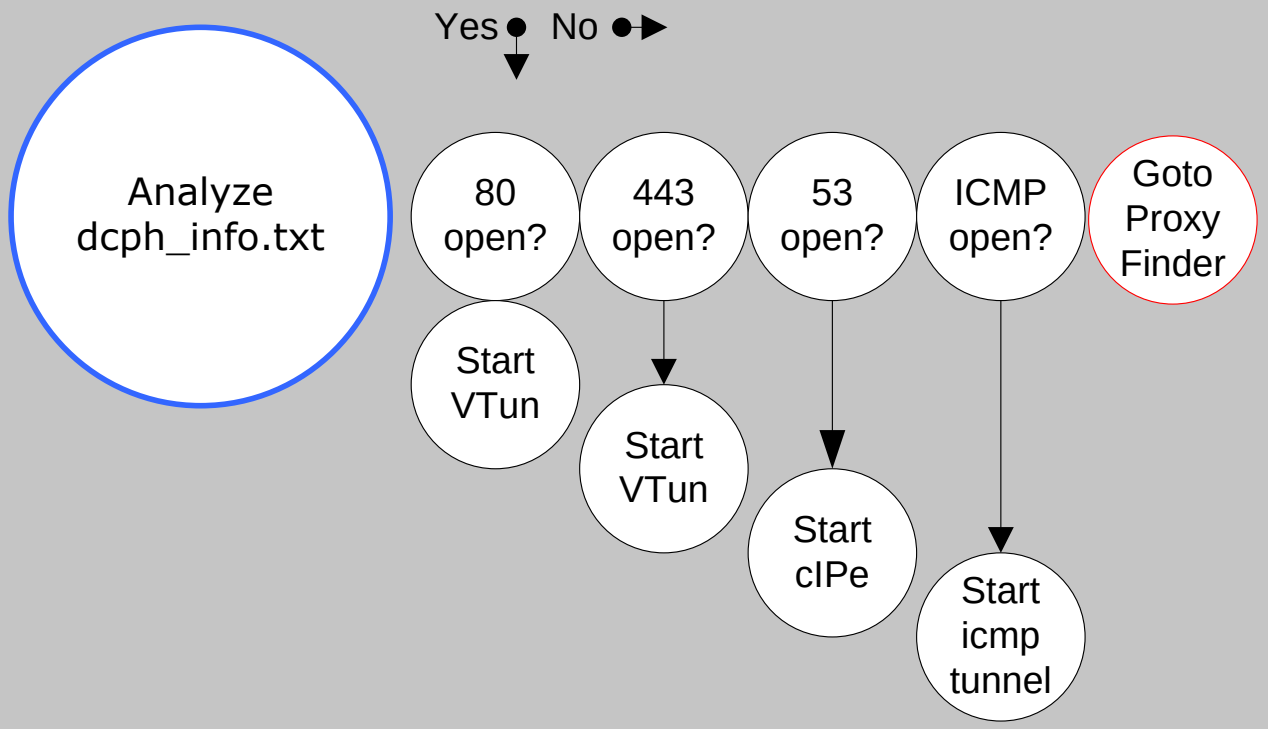
180-Degree Hacking: Similar Concepts

- P2P File-sharing
  - WinMX
  - Bearshare
- Chat Appz
  - Aim
- Remote Desktops
  - GoToMyPC.com

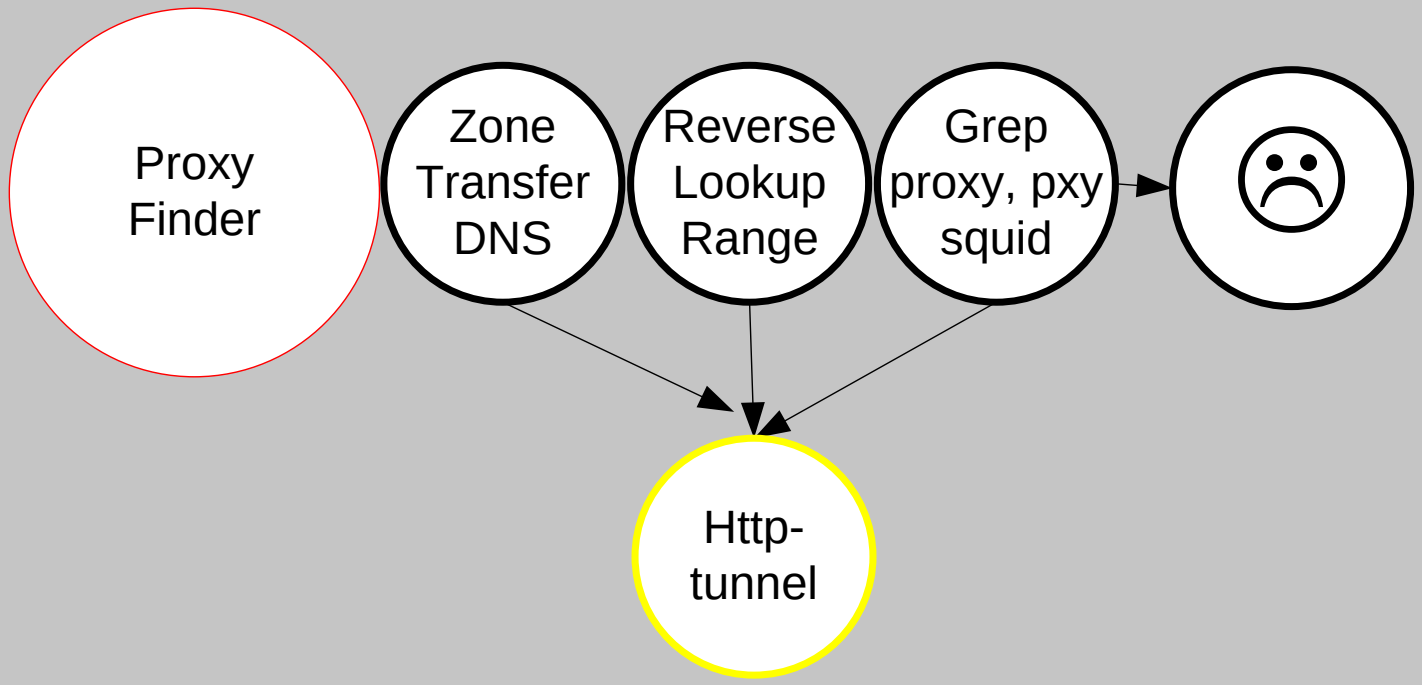
180-Degree Hacking: Network Discovery



180-Degree Hacking: Analysis



180-Degree Hacking: Proxy Finder



180-Degree Hacking: Delivery Types

- Drop-n-go hardware
  - SEGA Dreamcast
  - Compaq iPAQ
- Software
  - Bootable x86 CD-Rom
- Remote Exploit
  - duh

DC Phone Home

- Why the hell did we pick a Dreamcast!?
  - Innocuous: doesn't it just play games?
  - Cheap: under $100 for everything
  - 10/100 Ethernet: made just for hacking
  - Powerful processor
  - Rumors of a Linux port
  - Crazy Taxi got boring

Dreamcast Architecture

- Hitachi SH4 Core Processor @200MHz
- 16MB RAM
- CD-ROM
- 10/100 RTL-8931 Ethernet
- Keyboard (pretty useful)

Dreamcast Development

- Building the distro
  - RPMs from www.sh-linux.org
  - X-Compile Toolchain
  - Kernel patching and compiling
    - Experimental support in recent 2.4 kernels
  - Linux development waning since DC was discontinued
- Compiling Toolz
  - Limited RAM prevents native compilation

Compaq iHACK Architecture

- Compaq iPAQ 3765
- StrongARM 206MHz core processor
- 64MB RAM
- 32MB Flash ROM
- Dual-Slot PCMCIA Expansion Pack
- USB/Serial Interface
- 10/100 Ethernet and 802.11b capable

Compaq iHACK Development

- Linux Support
  - ARM proc support in kernel since 2.2.x
  - Large group of Linux developers
    - www.handhelds.org
  - Functional distribution available
    - Used Familiar v0.5.2
  - Native compiler
    - Independent development platform

x86 Bootable CD

- Trinux
  - Support's many types of hardware
  - Runs on virtually any PC
  - 20meg ISO
  - Kernel 2.4.5
  - Easily modified

Toolz

- Network Autoconfig
  - DHCP
- Scanning
  - netcat
  - nmap
- Sniffing
  - PHoss
  - ngrep
  - tcpdump
- Tunneling
  - VTun
  - CIPE
  - httptunnel
  - icmptunnel
  - stunnel
  - ppp
  - ssh

Common Tools

- host
- nslookup
- shell scripting
- sed
- cut
- tr

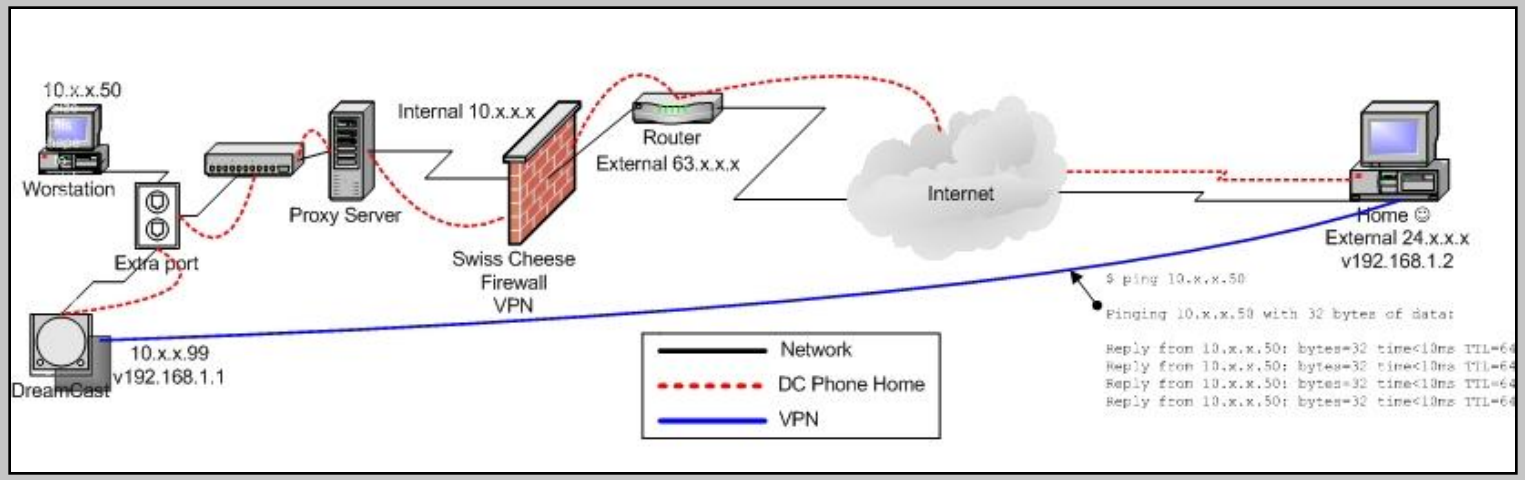
Phoning Home Simplified

- Delivery
- Booting
- Network autoconfiguration
- Network discovery
- Enumeration
- Tunneling

Demos

Enough chit-chat! Let's see it work!

Demo Summary



How is this stopped?

- To sum it up: constriction, not prevention.
  - Limited egress paths
    - As many proxies as possible
      - HTTP
      - DNS
      - Email
  - Full-mesh intranet VPN topology
    - Authentication between all endpoints, including gateways
    - Only prevents drop-n-go hardware

More Security Measures…

- Switch Port Security
  - Pre-registration of MAC addresses
- Superfine Granular IDS
  - Protocols must adhere to strict specifications
- Protocol-analyzing proxies
  - Can deconstruct sessions to detect misuse
- Wireless Jamming
  - Prevents rouge Access-Points

But…

- Covert channels will ALWAYS be possible
- Smaller devices make detection and removal more difficult
- Targeted attacks are based on research of your organization
- Like most information security, the only true protection is the air-gap

Links

- http://www.dcphonehome.com
- http://trinux.sourceforge.net
- http://www.sh-linux.org
- http://sites.inka.de/sites/bigred/devel/cipe.html
- http://www.phenoelit.de
- http://vtun.sourceforge.net
- http://www.nocrew.org/software/httptunnel.html
- http://www.detached.net/icmptunnel/
- http://www.stunnel.org
- http://www.buildinglinuxvpns.net
- http://www.foundstone.com
- http://www.redsiren.com
- http://www.realultimatepower.net

kitan@webcubicle.com

aaron@beesecure.org