Today's Modern Network Killing Robot

Viki Navratilova
viki@uchicago.edu
Network Security Officer
The University of Chicago

How to Create a Network Killing Robot

- Slap together different technologies
  - Borrow from the strengths of each
- Make it easy for lots of people to use (AOL effect)
  - Means giving up 'I am an elite hacker' snobbery
- Widely distribute it to non-tech people
- Automate everything
- Distribute as much as you can over the Internet
  - Reduces single point of failure
- Give people the ability to express themselves through the tools

IRC & DOS, two great tastes that taste great together

- IRC (I Repeat Classes)
  - Widely available networked benign application
  - (relatively) effective way to fulfill need to socialize
  - Easy to use application
- DOS (Denial of Service Tools)
  - Effective way to communicate emotions to others
  - Lots of engineering effort goes into DOS tools
  - Always evolving in response to new ways to block them

A Brief History of Denial of Service Attacks

Early DOS attacks

- ping of death
  - Simple network flood
  - either single very large ping packet, or a flood of large or small ping packets
- smurf attack
  - Amplified network flood
  - widespread pings with faked return address (broadcast address)

- syn flood
  - Overload the machine instead of the network
  - Send a bunch of SYN packets to a host on different ports to open a connection, and don't finish opening the connection

Honey! I think our network is having another Smurf attack!
Julie ©2000

Distributed Denial of Service (DDOS) Tools

- trinoo,stacheldracht
  - faked source ip address
  - easy to spot and filter
  - Much more devastating than old DOS tools
  - Harder to track back to the attacker
  - Made famous in the media when cnn.com, yahoo.com, ebay.com DOS'ed for several hours
  - Generally required breaking into each DDOS drone by hand to install the DDOS software

A Brief History of IRC Bots

eggdrop bot - Jeff Fischer, 1993

- download from www.eggheads.org
- usually used to mind irc channels when their human ops weren't there
- windows port is called windrop
- still widely used today

bnc – the bnc group

- IRC server proxy
- found on a lot of compromised machines in the wild
- hides your IP, so you are protected from DOS attacks and exploits
- you select port, password, max # of users, and hosts.allow for ips
  /server shell.server.com portnumber password
- good for anonomyzing trash talking and IRC-based attacks
- everyone sees the IP address of the BNC server
- if people attack your BNC server
  - slows down your IRC connection and might disconnect you from IRC temporarily
  - your computer is safe

Parallel Evolution of Two Tools

IRC

- irc scripts (aliases for sending files)
- irc bots for file sharing & keeping the channel op'd while you're away
- netsplits would accidently give people ops
- channel wars break out & netsplits are caused manually to give ops
- irc bots start to keep the channel up during netsplits - two bots fight it out, the one on the better server wins
- irc bots themselves start to cause netsplits
- irc bots start to attack (pax0r) individuals (be polite!) (started in mid '90's)
- irc bots used to be mostly unix are now mostly windows
- people write scripts to automatically scan, break in, and install irc bots (eggdrop)

Denial of Service

- Becomes common later than IRC
- starts simply by poorly written software or shell scripts
  - CS students accidently fork bombing
  - too many wgets taking down a server
- network dos (started in mid '90's – Clinton Conspiracy?)
  - simple network flood - ping of death
  - amplified network flood - smurf attack
  - overloading machine instead of network - syn floods
- distributed dos
  - dos itself becomes scripted & remotely controlled
  - trinoo, stacheldracht make the news
  - setting it up (breaking-in & downloading) is mostly done manually

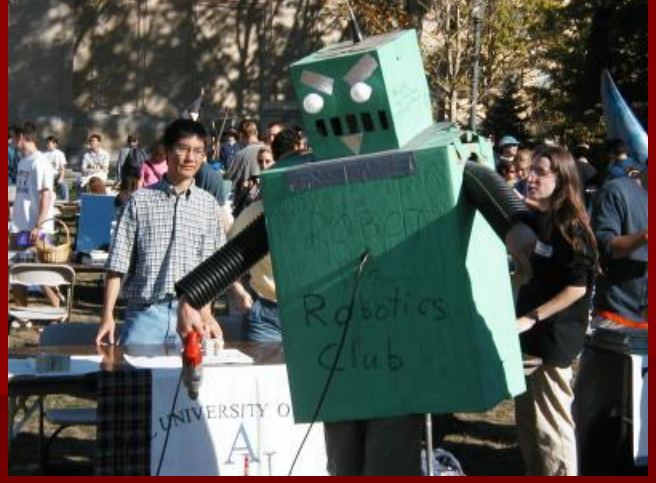
- IRC & DOS come together when people realize they can use irc to control what were once known as zombie machines

Today's Modern Network Killing Robot

- irc bots control everything in one handy package
  - scan, break in, carry out dos attacks on demand
- having so many machines that DOS on demand makes the dos attacks into ddos attacks
- These networks of DOS'ing machines are called DOSnets

DoSnet tools

- immigrant child labor became expensive, so people started automating DDOS by using robots
- harder to filter because they come from all over
- may or may not use spoofed source addresses, not necessary because individual botnet nodes are cheap to replenish
- little to no media coverage, so users and sysadmins are largely unaware of how widespread they are
- hide in legitimate IRC traffic, no special ports used



DoSnet tools

- botnet Masters & bots can hide in channels that most people can't see (hidden channel, appears the channel is empty from outside, special characters in channel name, etc.)
- infection of hosts with botnets is much easier than before, no more need for children in sweatshops to individually compromise each host for a traditional DDOS drone network
- DoSnet botnets are much more flexible than DDOS drones
- Dosnet bots can include various programs so they can run almost anything

  - examples: Ping of death, fragmented IGMP flood, flood irc channels,etc.

DoSnet Methods of Infection

- trojaned file containing a bot sent through e-mail via attachment
- web browser exploits (usually IE) download a small executable invisibly to a desktop, which then downloads a bot and runs it in stealth mode
- blank or weak admin password, password is guessed, script logs on, download and runs bot
- looking for something currently infected with another trojan such as SubSeven

evilbot

- backdoor windows trojan
  - copies itself to the \Windows\System folder
  - adds itself to the registry (who doesn't?)
    sysyemdl %system%\sysedit.exe
    HKEY_LOCAL_MACHINE\Software\Microsoft\
    Windows\CurrentVersion\Run
- backdoor is accessible via IRC
- attacks other computers using IRC

gtbot (global threat bot) - Sony, mSg, & DeadKode, 2000

- renamed mirc client containing various mirc bot scripts
- runs in stealth mode using HideWindow program
- often downloaded by people on irc who are tricked into thinking it's a
- clean mirc client, or installed on a compromised machine as the payload of the automated compromise
- supports plugins, so adding in programs to do extra stuff (like sending fragmented IGMP packets) is easy

gtbot on irc

- connects to a channel on an IRC network & waits for commands from the bot master
- commands include:

!scan
usage:
!scan <ip.*> <port>
!scan 1.1.1.* 31337
example : !scan 128.135.75.103 31337

!fileserver.access
no usage, if the the address of the user = %master, then they can spawn an fserve from the root of C:\.

!up
attempts to op the $nick in the current channel.

- !info
- no usage, gives information about the client such as:
- date, time, os (which type of windows), uptime, number of .mp3s, number of .exe's, number of .mpg's, number of .asf's
- and which url the client it currently viewing.

!clone.c.flood
constant flood, sets a timer to continually flood a channel or nick.

!flood.stop
stops the above flood.

!super.flood
another flood type.

!super.flood.stop!
stops the above flood.

!portscan
usage:
!portscan <ipaddress> <startport> <endport>

!update
attempts to get an update from a webpage, if your address matchs %master.
usage:
!update <url>

gtbot registry key settings

- - adds registry key to make sure it starts at boot, such as:
- HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Run "WHVLXD"
- Type: REG_SZ
- Data: C:\<folder gtbot is in>\WHVLXD.exe
- - modifies mirc registry key values:
- HKEY_CLASSES_ROOT\ChatFile\DefaultIcon "(Default)"
- Old data: "C:\MIRC\MIRC.EXE"
- New data: "C:\<folder gtbot is in>\TEMP.EXE"

- HKEY_CLASSES_ROOT\ChatFile\Shell\open\command "(Default)"
- Old data: "C:\MIRC\MIRC.EXE" -noconnect
- New data: "C:\<folder gtbot is in>\TEMP.EXE" -noconnect

- HKEY_CLASSES_ROOT\irc\DefaultIcon "(Default)"
- Old data: "C:\MIRC\MIRC.EXE"
- New data: "C:\<folder gtbot is in>\TEMP.EXE"

- HKEY_CLASSES_ROOT\irc\Shell\open\command "(Default)"
- Old data: "C:\MIRC\MIRC.EXE" -noconnect
- New data: "C:\<folder gtbot is in>\TEMP.EXE" -noconnect

- HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\Uninstall\mIRC
- "UninstallString"
- Old data: "C:\MIRC\MIRC.EXE" -uninstall
- New data: "C:\<folder gtbot is in>\TEMP.EXE" -uninstall

How to remove gtbot

- if you have this on machine, odds are good that you have other problems & other backdoors installed
- download a tool such as Lockdown Corp's LockDown 2000 or their free scanning tool SwatIt!
- delete the registry key it created to make it start up after every boot

  - make a backup of your registry first

  - mirc registery keys shouldn't affect system operation, so they don’t have to be deleted

How to remove gtbot (cont.)

- can either reboot and kill the bot files
- look for a mirc.ini file in a place where it shouldn't be, and probably delete the entire folder that contains the mirc.ini file if it looks like it's been created by the bot
- doing a search for all the mirc.ini files on your system should reveal all the bots on your machine (sometimes hidden in windows font directory)
- should only have one mirc.ini file for each legitmately installed version of mirc

How to remove gtbot (cont.)

- possible to hexedit the bot so it starts up off another file name other than mirc.ini, so looking for mirc.ini may not always work
- or can kill the process and delete the files
- be sure the process has stopped running before you delete anything
- if one opens on your desktop, close it using the X at the top of the window
- some bots signal destructive routines if someone types something into them
- don't use a bot for chat

sdbot

- copies itself somewhere to the Windows System directory or a subdirectory
- connects to IRC servers & joins pre-selected IRC channel (hardcoded)
- receives control commands from its master such as:
  - download files
  - execute remote files
  - act as IRC proxy server
  - join IRC channels
  - send /msgs on IRC
  - sending UDP & ICMP packets to remote machines

- can remove by using something like McAfee or F-Secure Anti-Virus
  - can also try deleting individual files, but that might trigger all sorts of destructive triggers like deleting c:\ or the windows system folder, etc.

Demonstration

Ways to Detect a Botnet on Your Network

- subscribe to a mailing list like FIRST, NSP
  - require membership
  - members regularly watch internet-wide trends in bot activity and notify members
- look for flows to port 6667
  - look for timing
  - incoming microsoft-ds (445) to machine A, soon afterwards machine A starts outgoing irc (6667) traffic
- Use an IDS like Snort
  - generally unencrypted traffic, so easy to spot if you know what strings to look for
  - because of bot variations, bots can get around this
  - some bot variations encrypt their traffic

- use packeteer
  - look for top dcc talkers
  - high traffic indicates an irc bot, may or may not be a DDOS botnet bot
- look for machines with irc traffic and lots of udp or icmp traffic
  - really noticeable only when the botnet is attacking
- see people joining irc channels with formulaic nicknames
  - they get kicked and re-join later with similar nickname and same IP address as before
  - may or may not be a DDOS botnet bot

URLs for further reading

- bot scanners, bot information, interviews with IRC ops and backdoor authors

  http://bots.lockdowncorp.com/

- gtbot information
  - including lots of documentation on variants
  - lists of files each variant installs & file sizes & registry key mods to help you find them on your machine

  http://golcor.tripod.com/gtbot.htm

- download sdbot

  http://wintermarket.org:81/~sd/sdbot/news.shtml

- download gtbot & a bunch of others and their variants

  http://www.weblinxorz.com/bots/bots.html

More urls...

- download eggdrop
  http://www.eggheads.org
- download BNC
  http://www.gotbnc.com/
  http://bnc.ircadmin.net/

I for one, welcome our new robot masters. Questions?