## How to win CCDC

A Red Team perspective

THIS PRESENTATION IS FREE FOR ANY AND ALL USE AND UNDER NO LICENSE.

#### **SOAP BOX**

CCDC has both positive and negative effects on those competing on both the red and blue team (student defensive teams) sides. The positives are:

- quick priority based problem solving
- access and on-the-job training with enterprise grade infrastructure and defensive technologies
- access to industry talent and contacts to hiring firms

However, there is a lack of realism that, no fault to CCDC staffers, is impossible to virtualize or simulate, which can lead to misconceptions on both sides if the players are unaware of it. Budgets, vast array of software/technology solutions, large user base and large infrastructure are just some of the scale issues that CCDC is faced with simulating. For instance, a defender can very easily pinpoint a new service on a system if it's the only one they need to touch during the competition. And creating policies and procedures around that foundation can lead to problems on-the-job.

With the addition of the "cloud" to Nationals, and Mid-Atlantics SCADA systems this is coming closer to reality but still needs to be addressed to both the student and red team population at these events. IMHO --mubix

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#### Intro

#### Rob Fuller

- O Mid Atlantic CCDC Red Team since 2007
- National CCDC Red Teamer since 2012
- OA Senior Red Teamer at my day job
- OPentesting for a few years ;-)
- O Hak5
- o USMC
- O Father
- O <Incert acronym cert to make you trust me>

## Tell 'em what you're gonna tell 'em

- Year(s) in review what worked and didn't
- Practice and Preparation
- Know your team
- Know your role
- Know your space
- Know your network
- Know your defences
- Know your enemy
- Risk Prioritization
- Quick solutions to hard problems

# Year(s) in review

### What you do wrong...

- Get frustrated
- Don't ask enough questions
  - O White/Black cell is there to support you...
  - O Injects are the only way you need to support them
- Focus too much on what is going wrong
- Patch everything
- Leave default passwords
  - O Windows
  - O SSH/Linux
  - O Web Applications / Administration
  - <sup>o</sup> Databases

## Your complaints about the Red Team

Stolen from http://bit.ly/rmudge\_derbycon

- •How many -1 days did you use?
- •If you have a head start that's unfair!
  - O Real world attackers started attacking any Org that you get a job at before you got there.
  - O You have the biggest advantage. You know we are coming. Don't expect to have this when you get to the 'real world'
- They used really advanced tools!
  - O Nope, we found DEFAULT credentials

# **Practice and Preparation**

# The ugly red book that wont fit on a shelf

- Create a playbook
- •Kill trees (have a copy for each member)
- Use Bit.ly instead of Googling for answers
- Password sheets \_FOR EACH DAY\_
- Cheat Sheets \_FOR STUFF YOU NEED\_
   Looking through pages of references is just as bad as having to google it
- List of known and standard users per OS
- List of known and standard services per OS

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- http://goo.gl/eTvaJk
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# **Know your team**

#### **Roles & Chain of Command**

- Team Captain
  - O Gopher
    - Firewall Admin
    - Linux Admin
    - Windows Admin
    - Web Admin
    - Client Services
    - Incident Responder

This list is in order of importance

# Know your role

period

# Team Captain Roles / Responsibilities

- Make sure everyone is where and when they need to be
- Coordinate responsibilities
- Constantly ask for feedback on tasks assigned
- Answer to the CEO and go to any and all meetings that are part of injects
- Focus team on objectives
- Stop any infighting
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   DO NOT GO INTO A MEETING EMPTY HANDED.
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 The team captain should \_NOT\_ be your most technical person. That person should be on the keyboard. You team captain should be able to manage projects, tasks, and people well. That is their job.

# Secretary Executive Assistant / Gopher

- Get/Download anything that is needed
- Get supplies / food stuffs
- Step in for Team Captain when not present
- Support all other roles as needed
- Deal with all paperwork based injects
- Inherits all physical security responsibilities
- Defend team against Nerf assaults

#### Firewall admin

- RAISE SHIELDS Mr Sulu!
- Monitor OUTBOUND connections
- Know your firewall and how to configure it
- Have or know exactly where to get any and all software you need to administer the firewall given to you.
- Egress and Ingress filtering
- IPv6 OFF (Unless required)
- deny any any is your friend
- Wireless gear is your baby, WPA2, WPS off (if possible), and long pass phrase
- Pass off Incident Reports to IR person
- CAPRICA (ACL generator) is \_AWESOME\_
   http://code.google.com/p/capirca/

#### **Linux Admin**

- GRSEC \_period\_ because it's fun to watch Red Teamers attempt privilege escalation on older kernels.
  - O Turn off the ability to change grsec settings via sysctl
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  - O Watch the audit log for signs of escalation attempts
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## Linux Admin (cont'd)

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  - O Tripwire
  - O OSSec (has pre-configurations for most \*nix)
- Nothing new should enter here without you knowing:
  - O/tmp/ (new files or binaries in here are bad news)
    - .hidden directory is a common place to put stuff
  - o crontab for all users
  - 0 ~/.ssh/ (and /root/ not just /home)
  - 0/etc/
  - O /etc/passwd & /etc/shadow & /etc/sudoers
- Know all SetUID binaries and watch for new ones

#### **Linux Commands**

- Final all 'immutable' files
  - o find . | xargs -I file lsattr -a file 2>/dev/null | grep
  - O 'chattr -i file' to change it back
  - O Doing this on / takes a long time, point it where it counts: /etc/, ~/, /tmp/ etc.. etc..

#### Sorry Raph..:-)

```
time find / | xargs -l file lsattr -a file 2>/dev/null | grep '^....i'
----i----------------- /etc/bob.txt
----i------------------- /etc/bob.txt

real 9m15.451s
user 0m51.505s
sys 6m38.862s
```

#### **Windows Admin**

- Event Viewer is your friend
- Autoruns is your friend
- Process Explorer and TCP View are your friend
- OSSEC works for windows too
  - (agent only, must talk to a Linux server for reporting)
- Change passwords and fast! (Automate if possible)
- Remove unused users and services
- Turn your firewall on and REMOVE EXCEPTIONS
- Turn off Teredo

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# Windows Admin - Changing Passwords Fast

- •Program one:
  - O AutoIt (make a binary to do it faster)
- Download one:
  - O http://bit.ly/bulkpasswordcontrol (AD only not local)
  - O Advantage: pseudo random passwords
- •Built in one:
  - O dsquery user ou=Users,dc=testlab,dc=net | dsmod user -pwd RedTeamSucks! -mustchpwd yes
  - O GPO for local admin passwords

## Windows Admin - GPO (Security)

# Some specific Windows Group Policy to set Security Options

- Network security: LAN Manager authentication level Send NTLMv2 response only\refuse NTLM & LM
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-- Export a config from a VM or other default install for reference:

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-- Edit to to have more secure settings then import onto your target system:

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- Microsoft Security Essentials free for SMB and home users so White Cell should be ok with it and hands down the best AV (IMHO)
- They have firewalls too! (nudge nudge)
- On windows systems install PeerBlock, it's a very small software package that does IP blocking for windows and supports LARGE IP lists (like every IP but my subnet) and supports egress
- On Linux remove all remote access options. It's a client, it doesn't need SSHd

## **Incident Responder**

- Windows
  - O Autoruns and other Sysinternals from a known good source. Ask White Team for a USB if you aren't allowed to have one/bring one
  - List logged in users (qwinsta)
  - If notepad.exe is running you've been breached
- Linux/BSD/Nix
  - O .bash\_history
  - O ~/.ssh/authorized\_keys
  - O Isof -nPi / netstat -ano
  - o know where logs are
  - o diff process list
  - o fuser -k pts/2
- Get the incident response forms and learn how to fill them out. Big points!
   5 dolla

# Know your space

## Physical space

- Go into blackout (everyone has a single role) every morning.
   Check everything from network cables to users, services, and passwords
- Baseline and inventory your gear every day
- Look for tape on mouses
- Schedule 20 minutes before the ending bell to police your space. Remove and secure all media (physical and digital)
- Tag (like in graphiti) all of your gear, think SPY movie (small piece of tape to know if someone opened the door)
- GSM bugs? Keyloggers? Wifi Access Points? Voice recorders? Stuff that Tom Cruise would use (minus the couch jumping)
- If the fire alarm goes off, ask the White Cell if it's real.

### **Verbal Space**

- If you get injects via phone, call back just like you (sh/w)ould your bank. Start to recognize the voice, have the same person answer every time.
  - Verify \_any\_ communication with alternative means. Challenge / Response

# Know your network

## Forget Snort/Splunk/Nagios/Cacti

- You do not have time to install and configure these, much less watch them. Don't.
- Event Viewer, /var/logs, .bash\_history
- Create a network map a head of time. Know it, love it, feed it breakfast
- NetworkMiner makes it easy to watch for new IPs connecting to/from your system
- nmap has NSE scripts to check for vulnerabilities
  - Nikto can catch easy web app stuff

# **Know your defences**

# What gets the most bang for the buck?

- A clear head
- Firewalls
- AV
- File Integrity Monitoring (FIM)
  - Logs

V

Patches (At least all of them we'll talk later)

# Know your enemy

# THE RED TEAM ARE NOT GODS

when someone asks you if you are a god, you say: YES!

#### **Realm of Possible**

- •ARP spoofing only works on a broadcast range. Configure your router/firewall and you're fine, stop worrying about it.
- DNS poisoning is hard and takes time, the Red Team \_probably\_ won't do it. Don't waste your time on it
- They cannot launch missiles by whistling the 2600Hz tone into your VoIP Phone

#### **ME GorrillIIIa**

- Red Team posturing is just that, ignore it
- Red Team isn't going to get in if you focus on the basics and keeping them out instead of getting them out

#### **Know the Red Team tools**

- Run Poison Ivy, know how to remove it
- Run Metasploit's attacks psexec, MS08\_067, and MS09\_050 and see what changes are made to the system
- Run Metasploit's persistence script, know how to get rid of it
  - AUTORUNS is your friend

# Risk prioritization

#### You patch too much...

- Patch what is exploitable. This will save on download time, install time, and maximizes impact. Assume certain vulnerabilities.
- If XP/2k3 then PATCH MS08\_067
- If Vista/7/2k8 then PATCH MS09\_050
- If Linux/BSD don't patch, secure the kernel

NO ONE IS GOING TO DROP ODAY AT CCDC

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This also closely resembles the challenges of enterprise networks as you won't be able to patch everything on every system. Go for what counts.

# Quick solutions to the right problems is the way to win.

Learn from mistakes, don't sweat them

### **Questions?**

#### Rob Fuller

- mubix@hak5.org
- @mubix on twitter
- http://www.room362.com/

Special thanks to Devon, Joseph, Marco, Aaron, Raymond, and Brian for the 1 AM jam session to get these slides together. Go social media.

Alex Herrick for GPOs and other suggestions Craig Balding for the beautiful 'iptstate' command

# Other Resources (need to add to main preso)

- http://ambuships.com/ <- Free HIPS that kicks ASS
- https://github.com/trustedsec/artillery <--</li>
   Sorta another HIPS but both Win and Linux
- http://la-samhna.de/samhain/ SAMHAIN -Linux IDS / File Integrity monitor
- •OSSEC...

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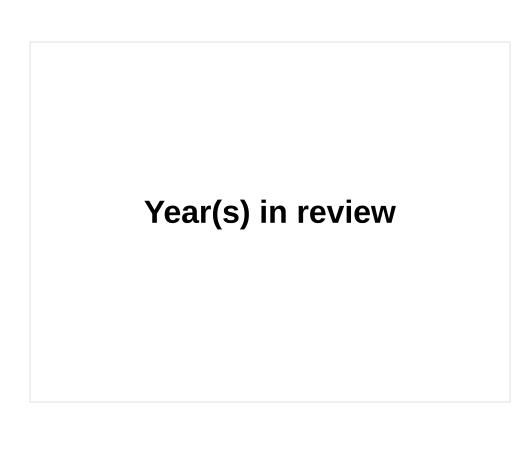
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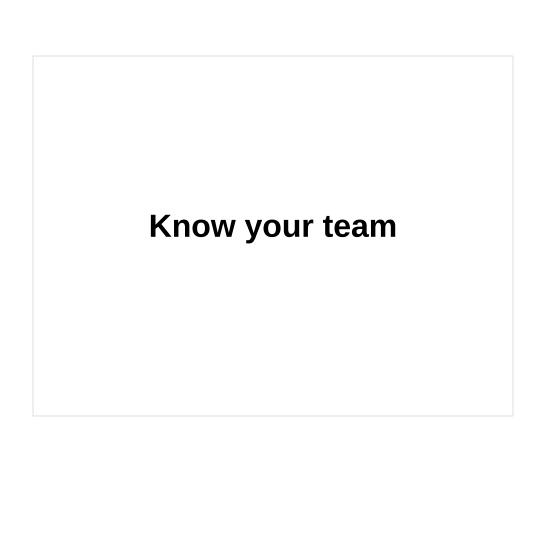
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**Audit Policy** 

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-- Edit to to have more secure settings then import onto your target system:

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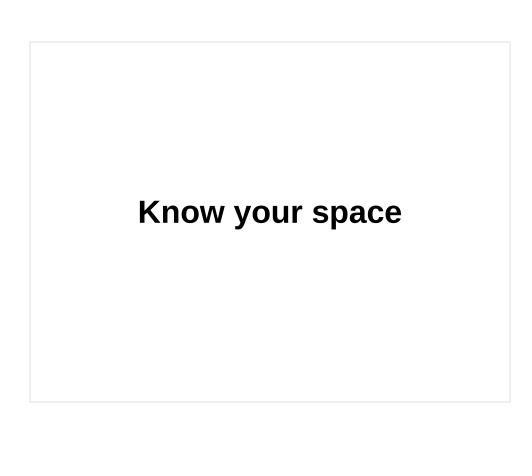
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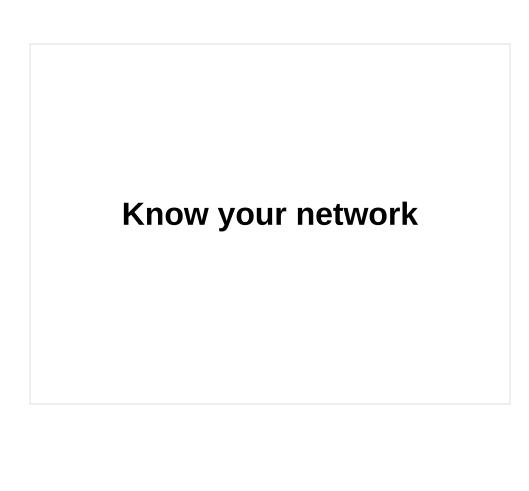


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- Look for tape on mouses
- Schedule 20 minutes before the ending bell to police your space. Remove and secure all media (physical and digital)
- Tag (like in graphiti) all of your gear, think SPY movie (small piece of tape to know if someone opened the door)
- GSM bugs? Keyloggers? Wifi Access Points? Voice recorders? Stuff that Tom Cruise would use (minus the couch jumping)
- If the fire alarm goes off, ask the White Cell if it's real.

# **Verbal Space**

- If you get injects via phone, call back just like you (sh/w)ould your bank. Start to recognize the voice, have the same person answer every time.
  - Verify \_any\_ communication with alternative means. Challenge / Response



# Forget Snort/Splunk/Nagios/Cacti

- •You do not have time to install and configure these, much less watch them. Don't.
- Event Viewer, /var/logs, .bash\_history
- Create a network map a head of time. Know it, love it, feed it breakfast
- NetworkMiner makes it easy to watch for new IPs connecting to/from your system
- nmap has NSE scripts to check for vulnerabilities
  - Nikto can catch easy web app stuff

# Know your defences

# What gets the most bang for the buck?

- •A clear head
- Firewalls
- AV
- File Integrity Monitoring (FIM)
  - ●Logs || ||

•Patches (At least all of them we'll talk later)



# THE RED TEAM ARE NOT GODS

when someone asks you if you are a god, you say: YES!

# **Realm of Possible**

- •ARP spoofing only works on a broadcast range. Configure your router/firewall and you're fine, stop worrying about it.
- DNS poisoning is hard and takes time, the Red Team \_probably\_ won't do it. Don't waste your time on it
- They cannot launch missiles by whistling the 2600Hz tone into your VoIP Phone

# **ME Gorrilllla**

- •Red Team posturing is just that, ignore it
- Red Team isn't going to get in if you focus on the basics and keeping them out instead of getting them out

# **Know the Red Team tools**

- •Run Poison Ivy, know how to remove it
- Run Metasploit's attacks psexec, MS08\_067, and MS09\_050 and see what changes are made to the system
- Run Metasploit's persistence script, know how to get rid of it
  - •AUTORUNS is your friend

# **Risk prioritization**

# You patch too much...

- Patch what is exploitable. This will save on download time, install time, and maximizes impact. Assume certain vulnerabilities.
- If XP/2k3 then PATCH MS08\_067
- If Vista/7/2k8 then PATCH MS09\_050
- If Linux/BSD don't patch, secure the kernel

NO ONE IS GOING TO DROP 0DAY AT CCDC

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This also closely resembles the challenges of enterprise networks as you won't be able to patch everything on every system. Go for what counts.

# Quick solutions to the right problems is the way to win.

Learn from mistakes, don't sweat them

# **Questions?**

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Special thanks to Devon, Joseph, Marco, Aaron, Raymond, and Brian for the 1 AM jam session to get these slides together. Go social media.

Alex Herrick for GPOs and other suggestions Craig Balding for the beautiful 'iptstate' command

# Other Resources (need to add to main preso)

- http://ambuships.com/ <- Free HIPS that kicks ASS
- https://github.com/trustedsec/artillery <--</li>
   Sorta another HIPS but both Win and Linux
- http://la-samhna.de/samhain/ SAMHAIN -Linux IDS / File Integrity monitor
- •OSSEC...