DumpsterFire Toolset

Generating Network & System Shenanigans to Manipulate Blue Teams

Presenter: TryCatchHCF

 @TryCatchHCF

Presenter Background

Principal Security Researcher & Red Team member at a Fortune 500

Prior roles: Principal Infosec Engineer, Pentest Lead, AppSec Team Lead, Shrubber of Fine Shrubberies

Former USMC intelligence analyst, counterintelligence specialist

Cmdr. Sisko was best Star Trek leader (Fight me)

Bachelors - Cognitive Science; Masters - Information Assurance

Certs - Various Acronyms, some of which hit me up for money each year

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Presentation Roadmap

- Background: Red Team Goals & Operations
- Challenges & Roadblocks
- Shenanigans / Examples
- DumpsterFire Toolset Walkthrough

Background

Red Team Goals & Operations

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Red Team Tasks

- Simulate full range of attackers
    - From loud “skiddie at the gates” to advanced “low and slow” pivoting & exfiltration, extended campaigns (months) as well as “smash & grab”
- Simulate “Errant Users”
    - Downloading, installing, and running unauthorized apps (file sharing, scanning tools, “malicious” utilities)
    - Running unauthorized services (FTP, Web servers, etc.)
- Purple Team
    - Tabletop exercises, coordinated SIEM config validation
- Physical security (not covered here)

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Red Team Tasks (cont.)

- Focus on rank-prioritized threats per analysis of organization's risk profile
- All for the purpose of helping Blue Team improve security (defenses, policies, procedures)
  - SIEM (Security Information & Event Management) tools
    - Tuning for best signal-to-noise ratios
    - Prioritizing alerts by type & volume
    - Identify gaps in detection, collection, alerting (settings & tools)
  - SOC/CIRT Response
    - Policies and procedures
    - Drills for teams & individuals (training & assessment)

Challenges & Roadblocks

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Red Team Dilemmas

- So much attack surface
  - So little time
  - So few resources

- Most organizations don't have Red Teams
  - Those that do, usually have small teams in high operational demand

- Difficult to scale Red Team even when you have one

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Red Team Dilemmas

- Common for corporate assets to be located worldwide
  - Multiple timezones to support
- SOCs are 24/7 with multiple shifts / teams
  - How to provide live exercise support for all shifts?
- Providing consistent, repeatable engagements
  - Want to compare “apples to apples” to track improvements & identify chronic problem areas

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Caffeine can only help so much.

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Not Just Red Team's Dilemmas

- 3rd-party pentesters suffer similar constraints
    - Limited windows of engagement
    - Often small team (or just one person)
    - Need to show maximum return on engagement
        - Single path to DC is useful, but limited
- Blue Teams don't have expertise in creating attacks
    - And even if they did… time & resource limitations
    - Internal bias towards existing configs & experiences

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Blue Team Dilemmas

- Orgs without Red Teams leave their Blue Teams untested
  - Stuck with “Annual 3rd-Party Nessus Assessment”
  - Tabletop exercises
    - Only test policy & procedures
    - Typically only one or two scenarios
  - No realtime operational tests of sensor thresholds or incident response edge cases

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SOC/CIRT Reaction:

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SOC/CIRT Reaction (cont.)

“Hey! I’m tested every single day with real world scenarios!”

- Sure, but missing some key things
  - Repeatability across shifts, using same live scenarios
  - Customized scenarios that simulate events your team hasn’t encountered yet, but should be ready for
  - Scenarios tailored to methodically test SIEM coverage & alerting
- You can only respond to what you’re already collecting & alerting on
  - “Don’t know what you don’t know” about gaps in sensors / alerting

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Great, so the Red Team can’t scale (or doesn’t even exist)

“What now?”

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Automation to the rescue!

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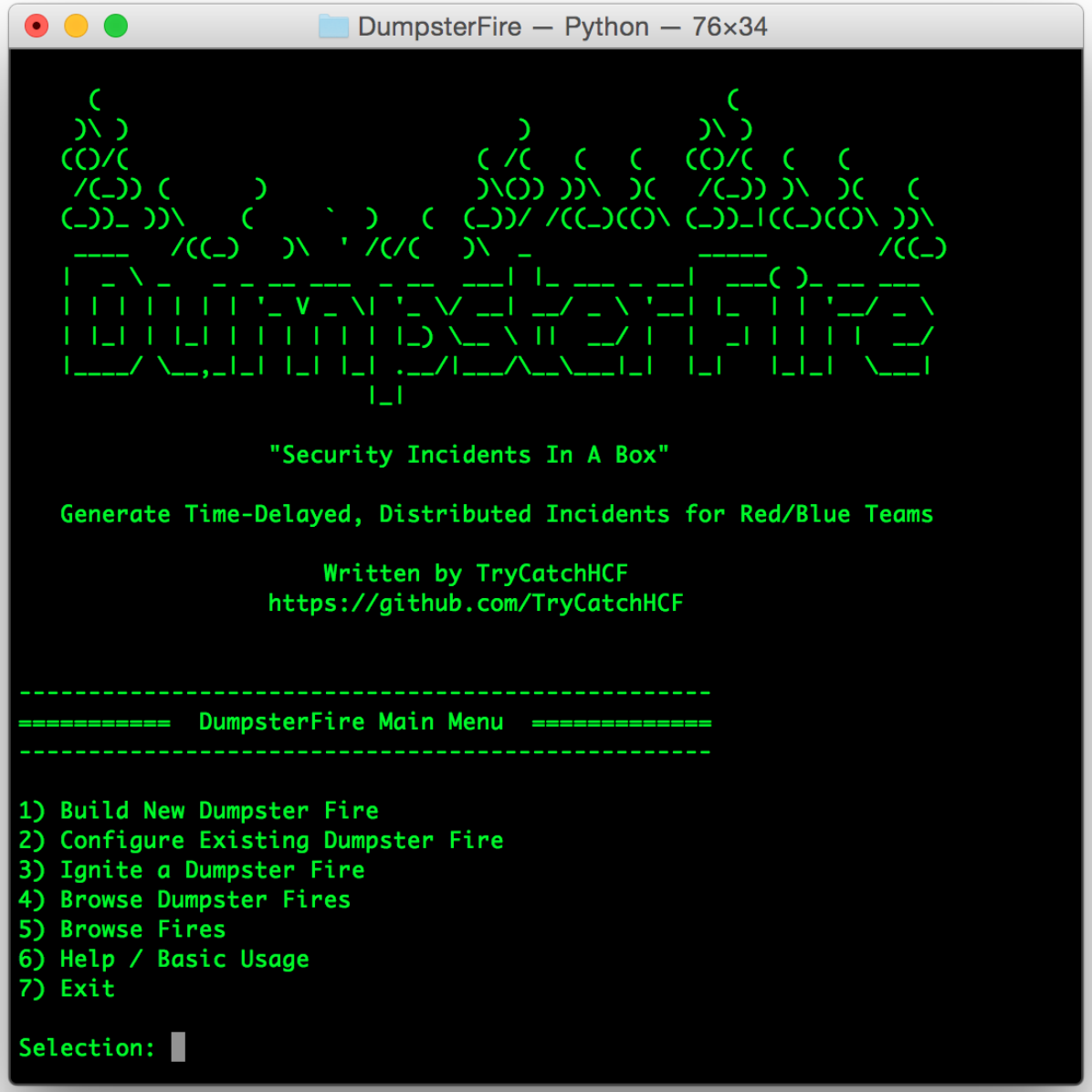

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Ever wondered how your Blue Team would respond to Mirai botnet activity on your internal network?

Let’s find out!

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Don’t have a Red Team but wish you had an easy way to run controlled drills against all of your SOC shift teams?

Plug-n-spray!

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Wish you could support a Red Team engagement against that remote team that's 8 timezones away, without waking up at 3:00am?

Hit that snooze button!

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Wish you could simultaneously rickroll all of your opponents' sub-networks during your annual cyberwarfare exercise?

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And while we're at it…

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Why settle for just one automated friend?

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But first…

Let’s talk about Shenanigans

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Staying Employed & Out of Federal Prison

- Standard rules-of-engagement boilerplate may not cover additional activities
    - If it's not in writing, it's not happening
- Simulate, don't destroy / corrupt
    - Goal is help Blue Team tune & improve, not impact business
- No automated pivoting
    - Too hard to control, can't guarantee you're still in scope
    - Building & deploying a worm **will never be in scope**

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Red Team Shenanigans

- Go beyond the standard attack chain we all know & love
  - Recon -> Scan -> Attack -> Persist -> Pivot
- Advantages in manipulating Blue Team
- 3 Categories
  - Distract
  - Lure onto Compromised System
  - Overwhelm

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Advantages in Manipulating Blue Team

- Move beyond the standard attack chain scenarios
- Better reflects evolving advanced attacks that follow up original attack chains with secondary infections & attacks meant to cover up the initial campaign
- Create parallel security events that provide SOC analysts with an easier investigative path to pursue (and close)
    - Generate the Occam's Razor you wish them to find
- Lure privileged users into your credential traps

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Goals in Manipulating Blue Team

- Move beyond the standard attack chain scenarios
  - Sound familiar yet?

- Give Blue Teams direct experience in managing layered attack scenarios, hands-on in their operational environment

- Help Blue Teams get to the next level, which in turn forces Red Team to get to their next level

  - Positive security feedback loop
  - Help analysts think strategically, not just tactically
  - Prepare analysts for evolving real-world threats

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Distract

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Manipulating Blue Team - Distraction

- Create distractions to throw Blue Team off your trail
- Build & execute complete parallel competing narratives
- Alternate points of compromise
  - Visits website; malicious app installed; loud activity
- Create scapegoats & decoys, mimicking methodologies and C&C infrastructure of known campaigns
  - Lead Blue Team down enticing (& utterly false) paths

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(But seriously, you really don't want your activities associated with an APT's methodologies / external C&C infrastructure / etc.)

(No, seriously. Just don't.)

(Unless it's in scope. In writing. And signed by people with authority to handle inquiries from the Feds.)

(Remember, we operate in a world where an externally sourced default nmap scan will make some orgs scream "APT!" and get your proxy provider subpoenaed.)

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Lure

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("Pearls Before Swine" is an amazing comic strip, btw)

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Manipulating Blue Team - Lure

- Sometimes admin credentials are hard to come by
- Credential traps are like fishing off a dock
  - “Hurry up and wait”
- Move from dock fishing to chumming the waters
  - Create events to lure admin users onto the network & systems that are hosting your credential traps
  - Use lower privilege accounts to socially engineer IT dept.

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Manipulating Blue Team - Lure (cont.)

- Using an unprivileged user's account, send email / Slack chat to admin(s) with a URL you're trying to access (compromised and hooked, of course)
- Fill a local or shared directory to capacity, requiring privileged user to access and cleanup
- Generate faulty network activity that interferes with users
- Any activity that will likely cause a privileged user to remotely authenticate to the resource (login, fileshare, etc.)

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Overwhelm

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Manipulating Blue Team - Overwhelm

- Create a volume of security events that overwhelm available resources, useful in various circumstances
    - Tactical Feint (e.g. loudly attack exposed Website login page while quietly exploiting RDP on adjacent network)
    - When you're ready to burn your operation
    - When Blue Team is hot on your trail & you need more time
- Each event requires fixed overhead of resources
    - Ticket Management - Open / Investigate / Close
    - Ties up at least one analyst
    - Simulating severe events raises priority & necessitates immediate attention

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Manipulating Blue Team - Overwhelm (cont.)

- Playing a numbers game
    - If staff can handle X critical events at a time, then generating 3X events means 2/3rds of those events will lay idle until the other events are investigated and closed out
    - If your staged distractions are perceived to be higher criticality than evidence of your actual operations, you can buy your team some critical time to complete your goals
- Best to only use “Overwhelm” during wargames or other exercises where operational SOC/CIRT teams will not be pulled away from critical duties

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Manipulating Blue Team - Overwhelm (cont.)

- Separate waves of events by time
  - Battlestar Galactica “Every 33 Minutes” effect
  - Just as responders are getting a handle on the current wave of events, the next series triggers
  - Only works if the event trigger mechanisms remain undiscovered
  - Fun to make each successive wave generate increasingly severe events

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Manipulating Blue Team - Overwhelm (cont.)

- Separate waves of events by time (cont.)
  - Example Scenario: Organization has Port 22 open on most systems for remote admin access. Network is segmented, but compromised credentials that give attackers access to all subnets.
  - Target multiple subnets for time-delayed, sequenced brute-force login attempts over SSH on Port 22 on local subnet. (Credentials are purposely chosen to fail.)
  - Select a system on each targeted subnet, login remotely and attempt to download payload from Red Team controlled external endpoints (Whack-a-Mole!)

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Shenanigans Bonus Round

Sometimes you just want to make things extra interesting

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Shenanigans Bonus Round

Linux/Unix: Edit global .bashrc / .cshrc / .bash_profile

Locations: /etc/bash.bashrc /etc/bashrc (check your baseline)

- `stty s erase`
  - ’s’ key is now the backspace key, annoys in random ways
  - Try typing ‘ls’ / ‘netstat’ / ‘stty’ / ‘erase’
- `alias ls=‘echo’`
  - Blank line printed instead of directory listing

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Shenanigans Bonus Round (cont.)

Linux/Unix: Edit global .bashrc / .cshrc / .bash_profile

- `alias pwd='echo "Directory not found"'`
- `alias cd='echo "Directory not found"'`
- `alias df='echo "Error accessing device"'`
- `alias du='echo "Error accessing device"'`
- `alias vi='echo "Could not allocate inode"'`

Troll emacs users while you're at it:

- `alias emacs='echo "vi refusing to allow emacs"'`

(.cshrc uses different format but you get the idea)

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Shenanigans Bonus Round (cont.)

Cross-Platform

- Take screenshot of active desktop, install as desktop background
- Hide all other open apps

or

- Download screen-grab of ransomware lock screen, install as desktop background
- Hide all other open apps

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Back to DumpsterFire!

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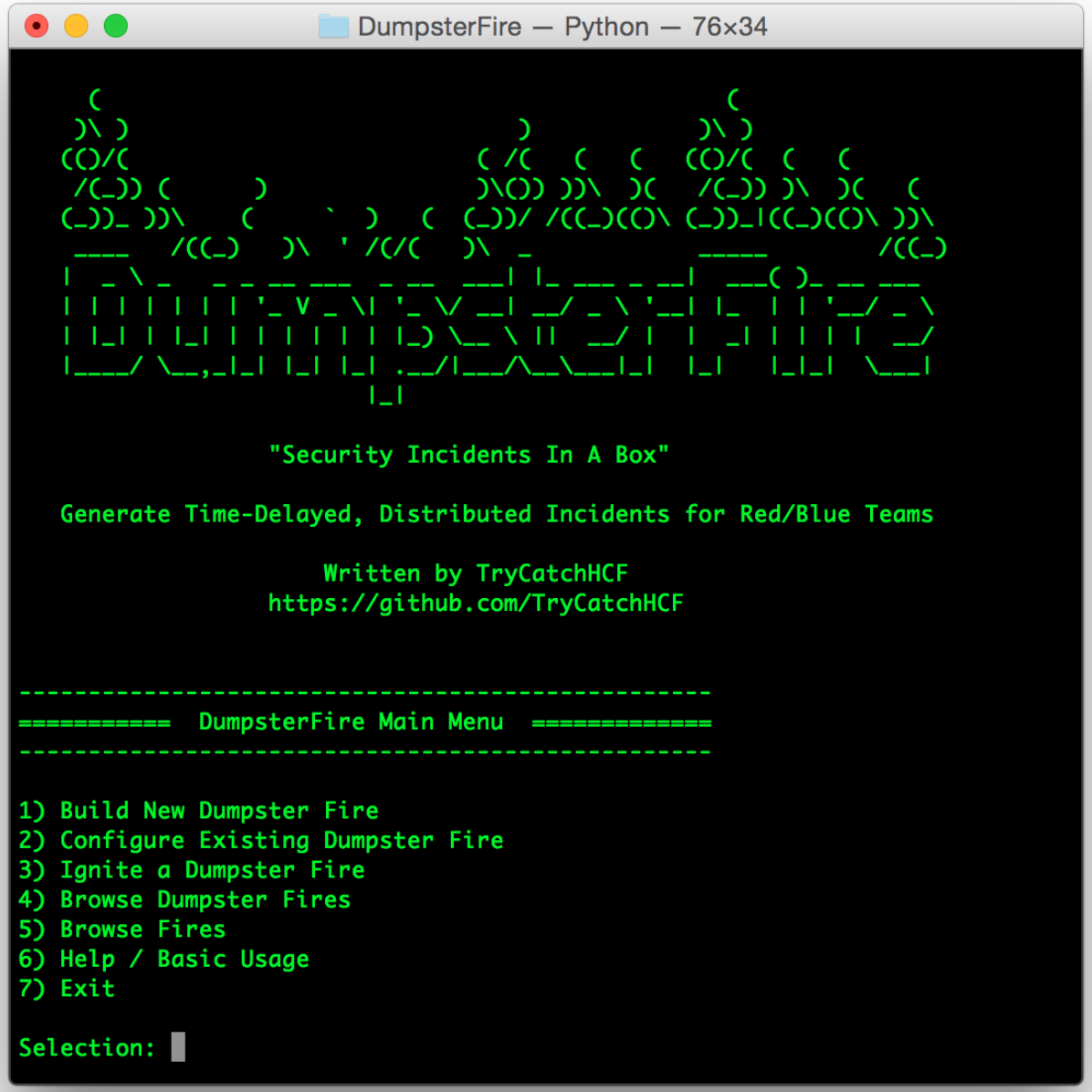

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- “Security Incidents In A Box!”
- Build & execute custom event chains to generate incident narratives / activities
- Time-Date Delayed Execution
  - Allows you to generate automated, sequenced events
  - Converts to Universal Coordinated Time (UTC) internally to avoid timezone confusion across global sites
- Parallel Deployments
  - Generate security incidents at scale, anytime, anywhere
- Numerous Fires plus pre-configured DumpsterFires to jumpstart your activities

DumpsterFire Toolset

- Lightweight, easy to use, easy to deploy
  - Menu-driven
  - Written in Python for cross-platform support
  - Quick start, immediate results

- Extensible - Customize for your unique threat space
  - Create your own Fire modules, add to Fires directory, start DumpsterFire Factory, burn away!

- No 3rd-party dependencies

- Open Source (MIT License)
  - “Free as in No Budget Approval Needed”

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“That’s a lot of word salad. Details please.”

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DumpsterFires

- Fires are modular events
  - Ex. Download a file; Scan a network; Login attempts
- DumpsterFires are collections of Fires
  - Chained together to create sequences of events
  - Functionality inspired by *nix command line utilities
- Tremendous power by chaining simple tools

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DumpsterFires (cont.)

Chained Linux Tools:

```
% cat log.txt | cut -d ‘;’ -f3,5- | grep -i “login” | sort -un
```

Chained Fires for an Insider Threat DumpsterFire:

```
Visit Webpage about revenge -> Download Metasploit -> Scan
local subnet for Top 20 ports -> Brute force attacks against
Port 22 SSH -> Upload random data tarball to Red Team
controlled external node -> Visit Webpage about modifying logs
```

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DumpsterFires (cont.)

- Building DumpsterFires is fun & fast, the tool guides you
- Modular process
  - Create a list of Fires in whatever order you want
  - Assign optional time-delta triggers to each Fire
  - Configure settings for selected Fires
  - Assign optional DateTime trigger to new DumpsterFire
  - Distribute & Ignite!

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Just Like Building a Teddy Bear!

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(Except the Teddy Bear is Evil)

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Fire Categories

- Network Scans (Loud & Wide; Targeted; Slow & Narrow)
- File Downloads (Github; Filesharing; Hacking Tools)
- Websurfing (Preconfigured URLs; Custom URLs)
- Account Bruteforcing (e.g. Simulated Mirai botnet activity)
- Filesystem Activities (Fill directory; Create IOC artifacts)
- Malware (Known C&C connects; Sinkholes; Custom)
- Custom OS Commands (Executes string you provide)
- Shenanigans (Annoying entries in shell profiles, etc.)

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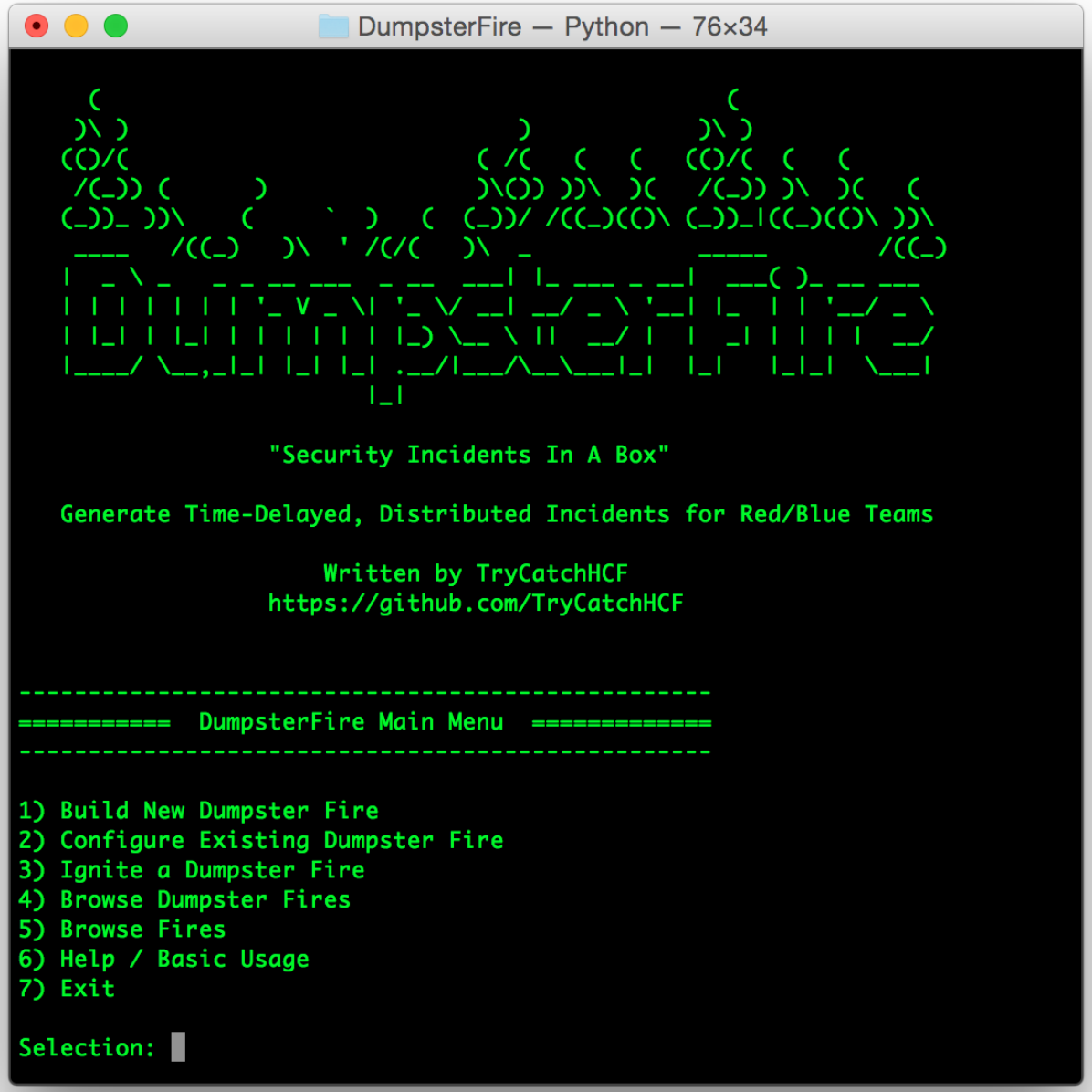

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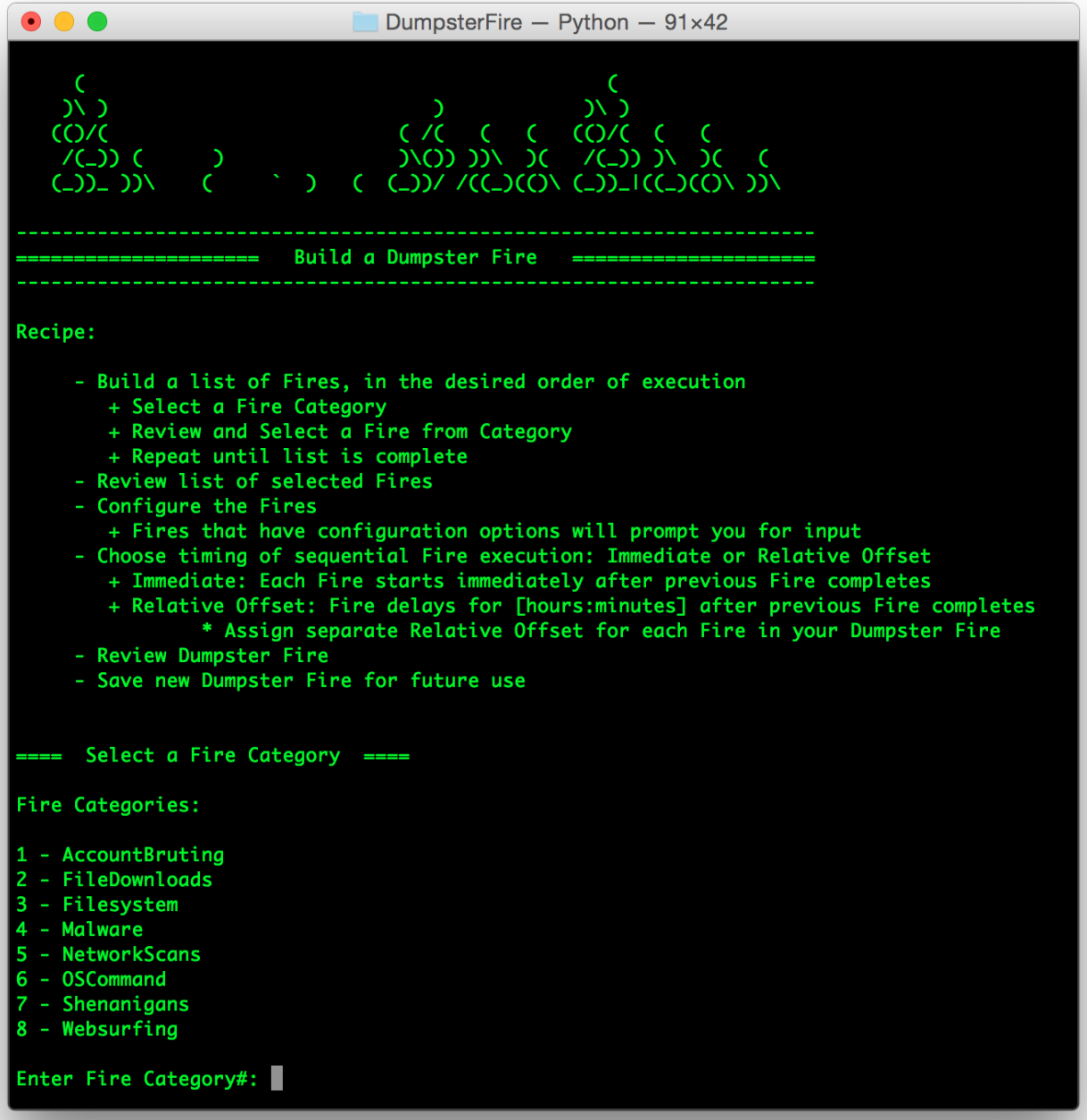

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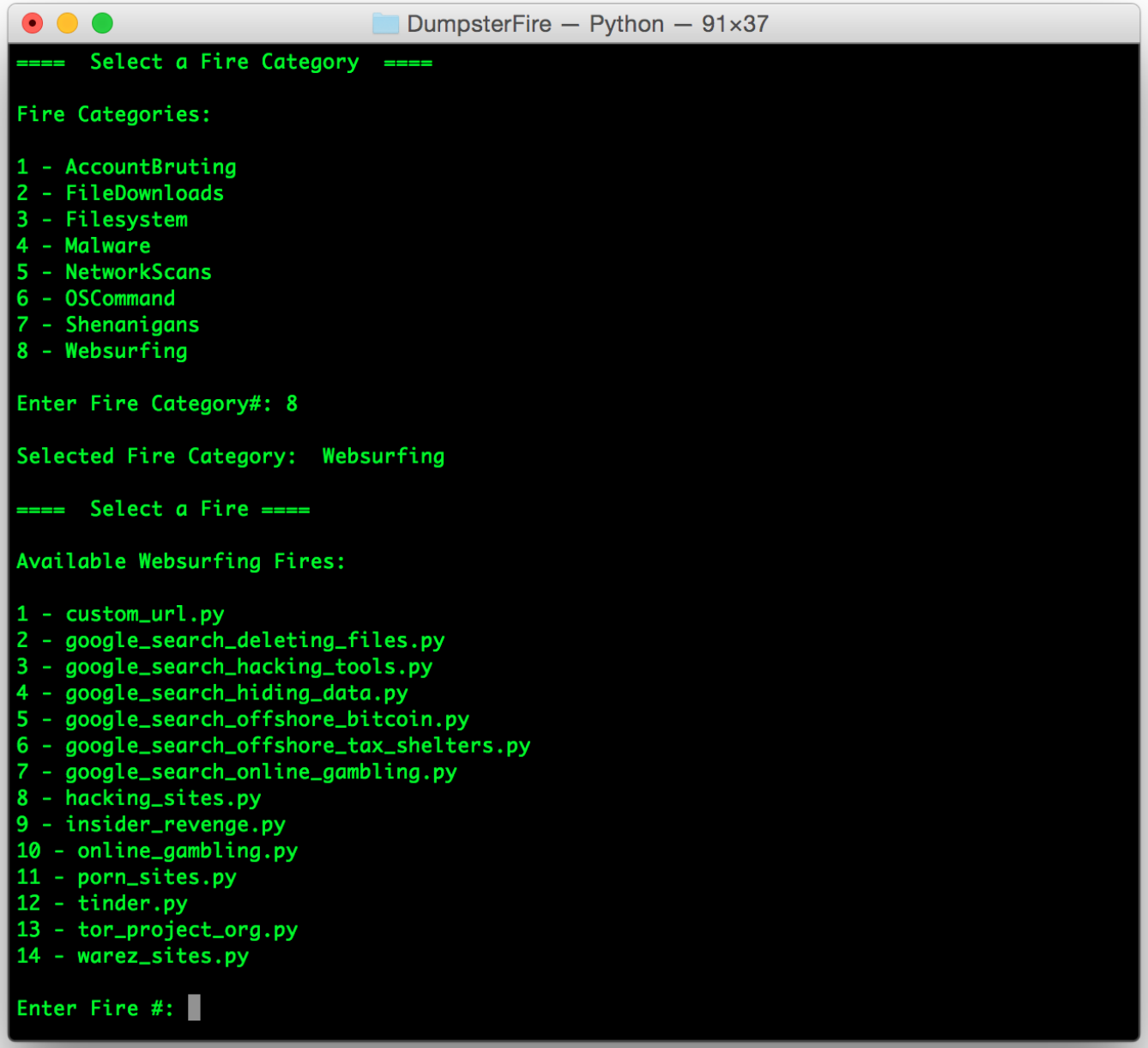

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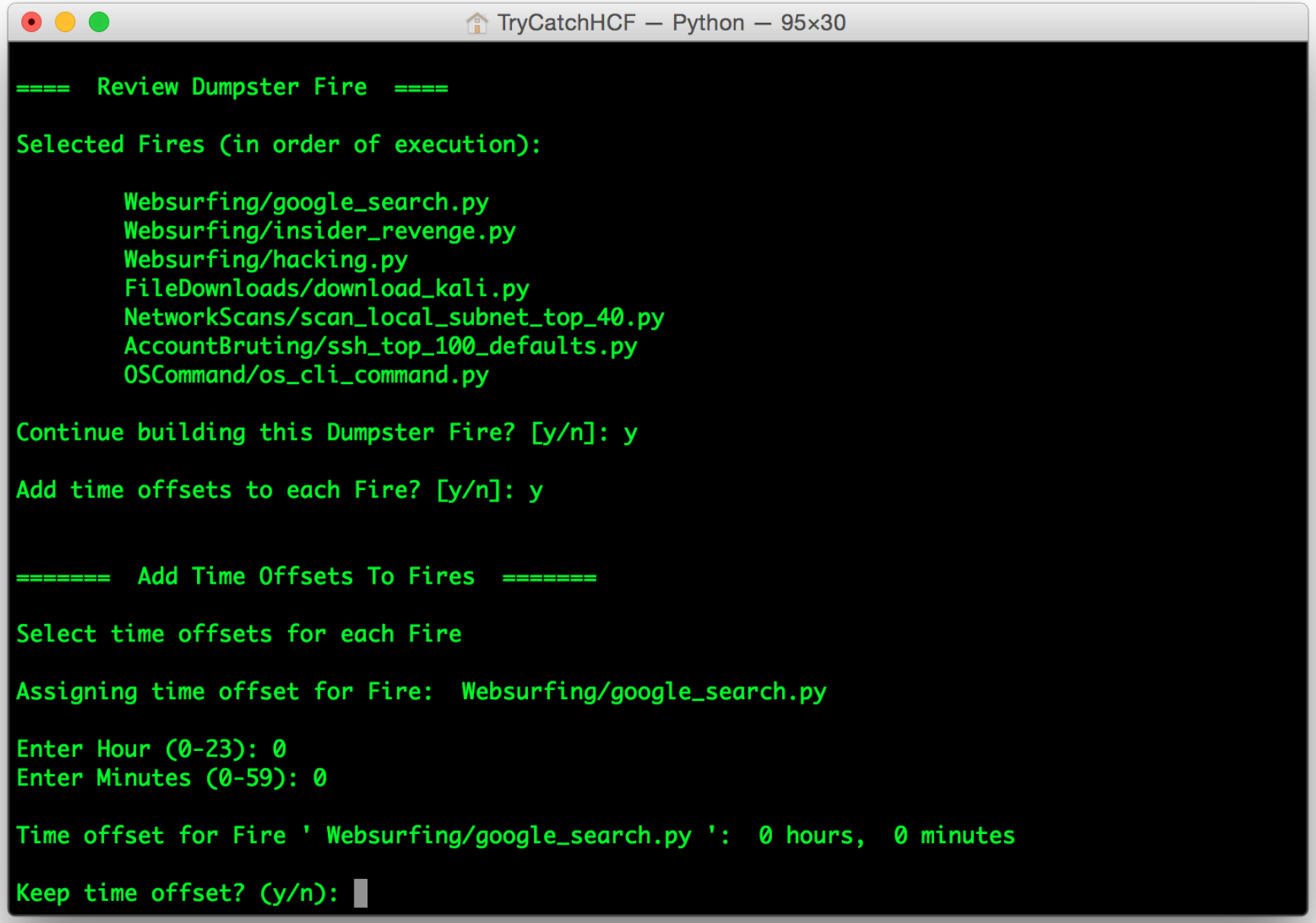

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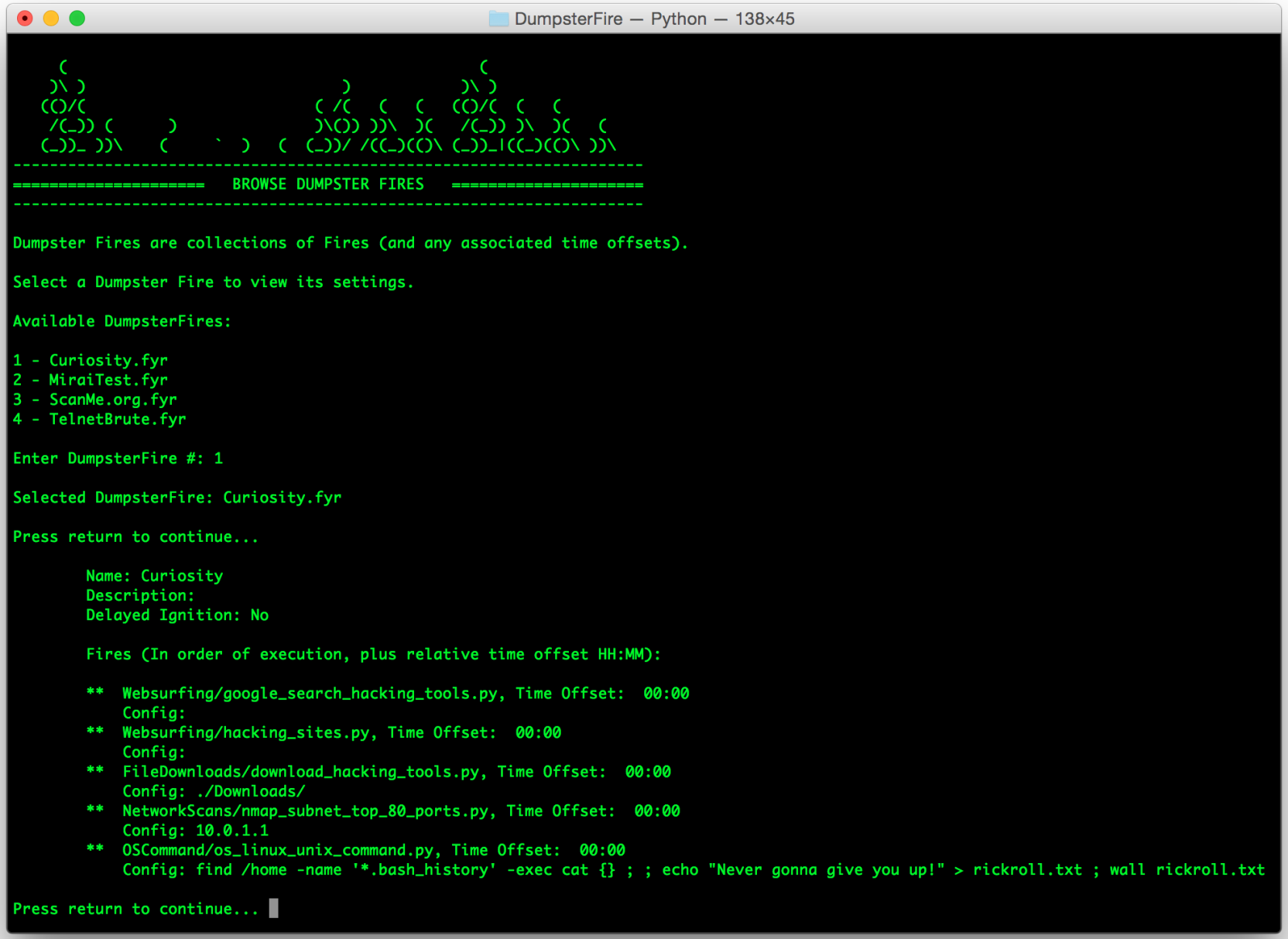

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Red Team Benefits

- Scale your Red Team network / system activities
- Reproducible tailored engagements
- Date/Time triggers allow your operations to proceed without you having to enter sleep deprivation
- Logging can be activated, each Fire generating datetimestamps of their activities for later review (and accountability) w/ Blue Team

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Blue Team Benefits

- Create and run tailored drills for your analysts
- Train and evaluate analysts in controlled scenarios
- Map & identify gaps in sensor coverage and alerting configuration
- Monitor & measure response
- Build history of results to demonstrate progress

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Creating Custom Fires

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Extensible Design

- Meant to be used, tailored for your operational needs
- NO HARDCODED CRUD TO MODIFY!
- Create your own custom Fire modules, drop into the collection of Fires, you're ready to go!
- Tool dynamically loads component content at runtime, based on contents of DumpsterFire's "FireModules/" directory
    - Fire Categories (generated from directory names)
    - Names of all Fire modules in each Category directory

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Extensible Design (cont.)

- Recommend you keep your custom Fire modules simple and functionally encapsulated
- Minimizing dependencies and complexity allows you to quickly combine your Fire modules in novel sequences to meet operational needs
- In many cases, you may instead be able to do what you need by using existing “OSCommand” Fire modules
  - Include as many as you need in your DumpsterFire
  - Each “OSCommand” Fire module in your DumpsterFire can have its own unique command string

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Extensible Design (cont.)

- For a quick start, copy and modify an existing Fire module that has similar functionality
- In the FireModules/ directory there is a Fire module template file you can copy ("custom_fire_template.py")
  - Contains comments, descriptions, and skeleton of all functions that must be implemented for your custom Fire module to integrate seamlessly with the tool
- Do NOT remove the "__init__.py" files in the subdirectories
  - Required for the tool to be able to dynamically load the Fire modules at runtime (it's a Python package thing)

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Extensible Design (cont.)

- To create a new Fire Category, create a new directory under `“FireModules/“`
- When you add new Fire modules to a Fire Category directory, the tool will automatically make them available (**do not use spaces or periods in your Fire names -** messes up package names)
- Have to restart the tool to pick up Fire Category changes
- Your Fire module must implement the following methods
  - Configure()
  - Description()
  - GetParameters()
  - SetParameters()
  - ActivateLogging()
  - Ignite()

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FireModule Template

- **Configure()**
  - Prompts user for input, populates FireModule’s parameters
- **Description()**
  - Return a string containing a description of the FireModule
- **GetParameters()**
  - Returns a single string of Fire's parameters
- **SetParameters(string)**
  - Takes a single string & populates Fire's members
- **ActivateLogging(boolean)**
  - Sets flag for Fire to generate a log of its activities (great for review)
- **Ignite()**
  - Executes Fire's actions

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https://github.com/TryCatchHCF

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