Mastering the Nmap Scripting Engine

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Outline

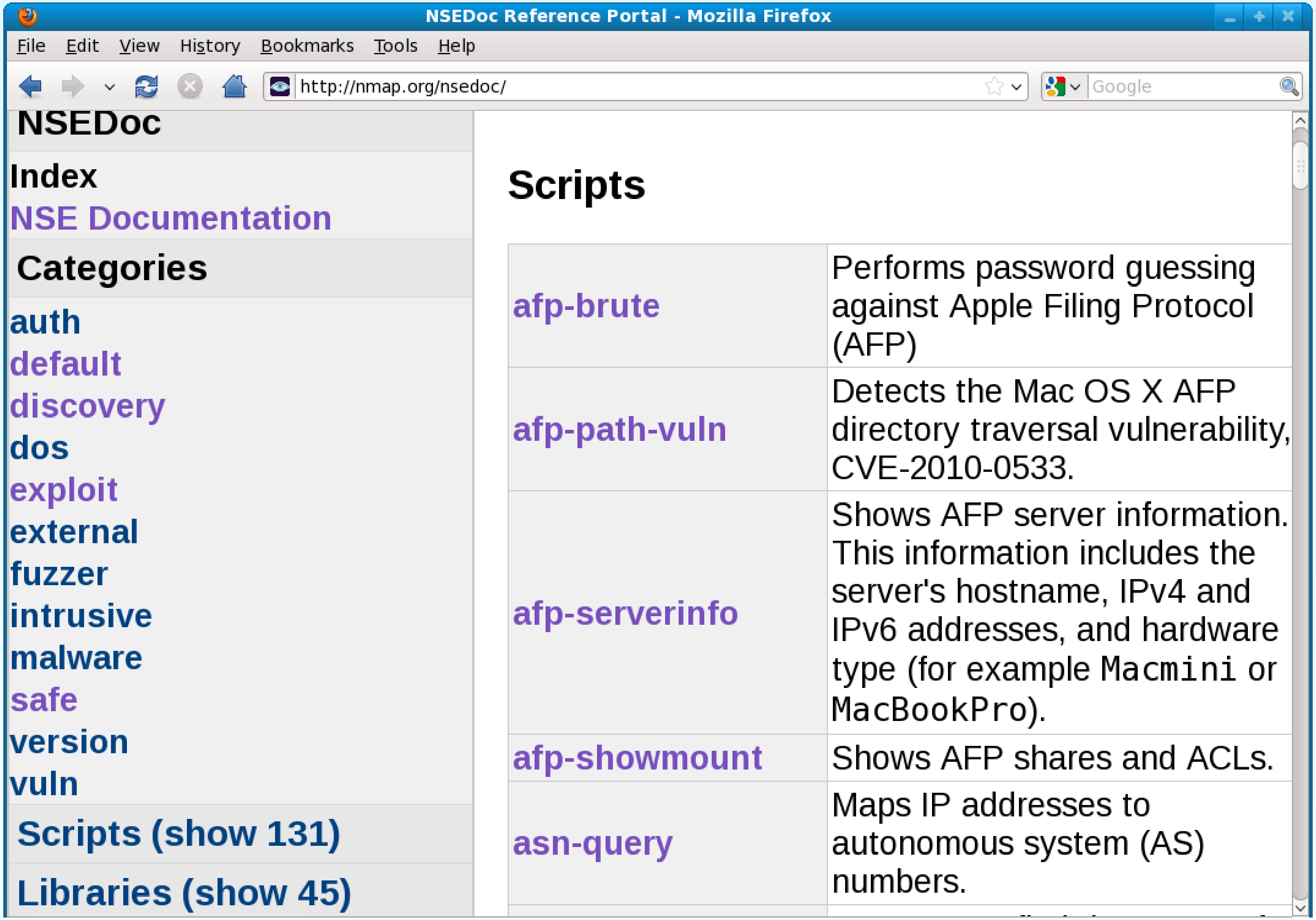
- NSE Intro & Usage
- Large-scale Scan: SMB/MSRPC
- Writing NSE Scripts
- Live Script Writing Demo
- Final Notes & Q/A

Nmap Scripting Engine

```
# nmap -A -T4 scanme.nmap.org

Starting Nmap 5.35DC18 ( http://nmap.org )
Nmap scan report for scanme.nmap.org (64.13.134.52)
Host is up (0.0018s latency).
Not shown: 995 filtered ports
PORT      STATE  SERVICE VERSION
22/tcp    open   ssh     OpenSSH 4.3 (protocol 2.0)
| ssh-hostkey: 1024
60:ac:4d:51:b1:cd:85:09:12:16:92:76:1d:5d:27:6e (DSA)
|_2048 2c:22:75:60:4b:c3:3b:18:a2:97:2c:96:7e:28:dc:dd (RSA)
53/tcp    open   domain
80/tcp    open   http    Apache httpd 2.2.3 ((CentOS))
|_html-title: Go ahead and ScanMe!
| http-methods: Potentially risky methods: TRACE
|_See http://nmap.org/nsedoc/scripts/http-methods.html
113/tcp   closed auth
31337/tcp closed Elite
OS details: Linux 2.6.13 - 2.6.31, Linux 2.6.18
Nmap done: 1 IP address (1 host up) scanned in 23.32 seconds
```

Pre-written Scripts and the NSEDoc Portal
http://nmap.org/nsedoc/


NSEDoc Reference Portal - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://nmap.org/nsedoc/
Google

NSEDoc

Index

NSE Documentation

Categories

auth
default
discovery
dos
exploit
external
fuzzer
intrusive
malware
safe
version
vuln

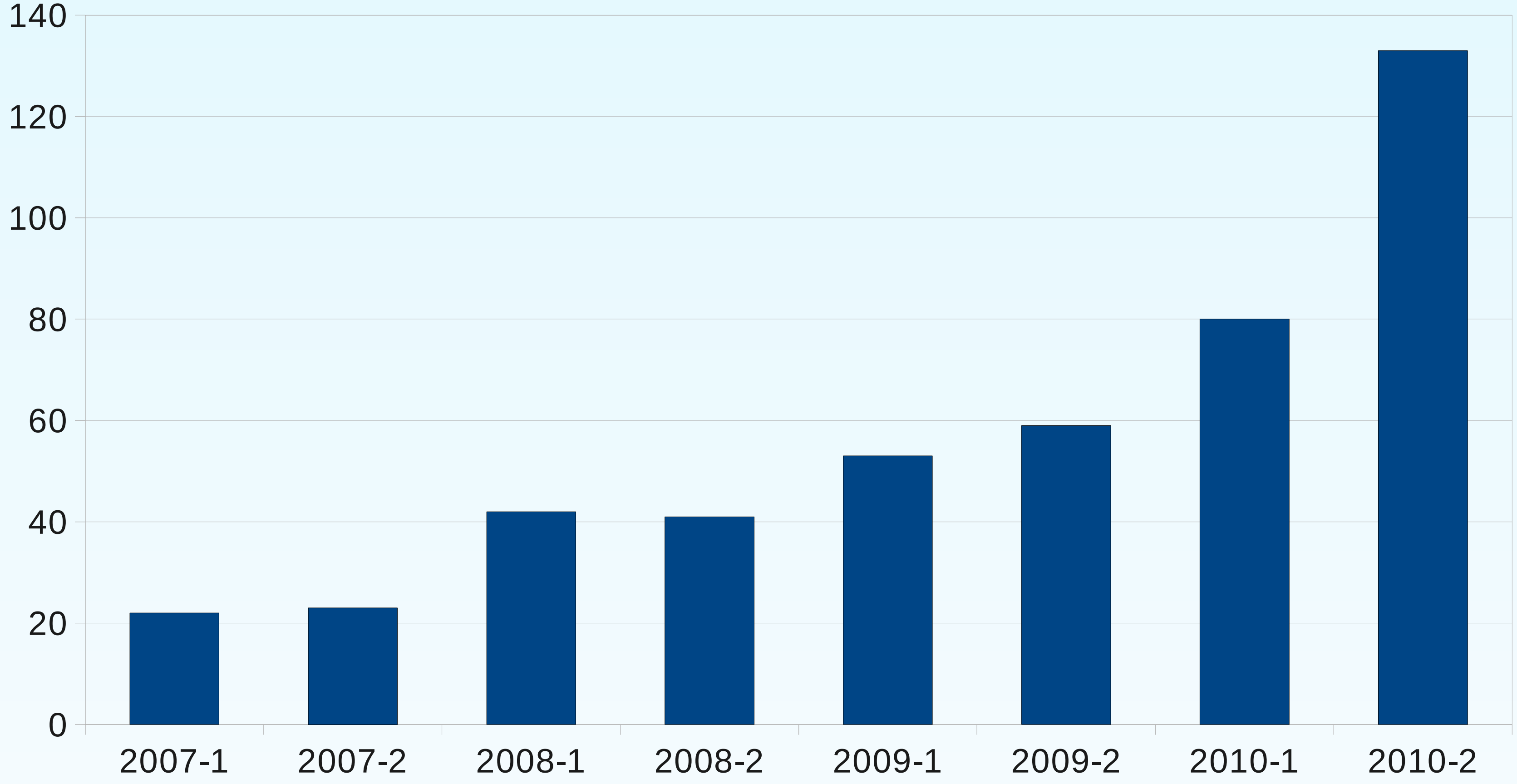
Scripts (show 131)

Libraries (show 45)

Scripts

afp-brute	Performs password guessing against Apple Filing Protocol (AFP)
afp-path-vuln	Detects the Mac OS X AFP directory traversal vulnerability, CVE-2010-0533.
afp-serverinfo	Shows AFP server information. This information includes the server's hostname, IPv4 and IPv6 addresses, and hardware type (for example `Macmini` or `MacBookPro`).
afp-showmount	Shows AFP shares and ACLs.
asn-query	Maps IP addresses to autonomous system (AS) numbers.

Script Collection Growth



Large Scale Scan #1: SMB/MSRPC Scripts

Ron Bowes spent months researching SMB/MSRPC protocols and wrote a suite of 13 scripts.

Informational: smb-os-discovery, smb-server-stats, smb-system-info, smb-security-mode

Detailed Enumeration: smb-enum-users, smb-enum-domains, smb-enum-groups, smb-enum-processes, smb-enum-sessions, smb-enum-shares

More intrusive: smb-brute, smb-check-vulns, smb-psexec

Who to test them out on?

MS Scan Details

- Step 1: Find target IP addresses. 1,004,632 located in ARIN DB.
- Step 2: Start broad version detection scan (nmap -T4 --top-ports 50 -sV -O --osscan-limit --osscan-guess --min-hostgroup 128 --host-timeout 10m -oA ms-vscan -iL ms.ips.lst)
  - Found 74,293 hosts up out of 1M IPs in 26 hours
- Step 3: Examine results

MS SMB Scan Results

- Vast majority of MS networks block Windows ports such as 135 and 445 at their gateways.
- ... but not all!
- New scan: nmap -v -O -sV -T4 --osscan-guess -oA ms-smbscan --script=smb-enum-domains,smb-enum-processes,smb-enum-sessions,smb-enum-shares,smb-enum-users,smb-os-discovery,smb-security-mode,smb-system-info [Target Ips]
- Results

Writing NSE Scripts

Introduction to Lua & Why We Chose It

- Lightweight embeddable scripting language
  - – Easy to learn
  - – Tiny to embed: “Complete distribution (source code, manual, plus binaries for some platforms) fits comfortably on a floppy disk”.
- Widely used, known, and debugged
  - – Created in Brazil in 1993, still actively developed
  - – Best known for its use in the game industry: World of Warcraft, Crysis, etc.
  - – Security tools: Nmap, Wireshark, Snort 3.0

Why We Chose Lua (Continued)

- Extensible
  - Hooked to Nmap's fast parallel networking libraries
- Safe & Secure
  - No buffer overflows, format string vulns, etc.
- Portable
  - Windows, Linux, Mac, *BSD, etc.
- Interpreted

Capabilities Added by Nmap

- Protocol/helper libraries
  - 45, including DNS, HTTP, MSRPC, Packet, SNMP, unpwdb, etc.
- Protocol brute forcers
- Easy SSL
- Dependencies

Script Example: rpcinfo.nse

Live Script Demonstration

Problem: Find my webcam on a dynamic IP address.

The webcam uses thttpd to serve /cam.jpg, so use a script to check those two things.

Make it a Production Script

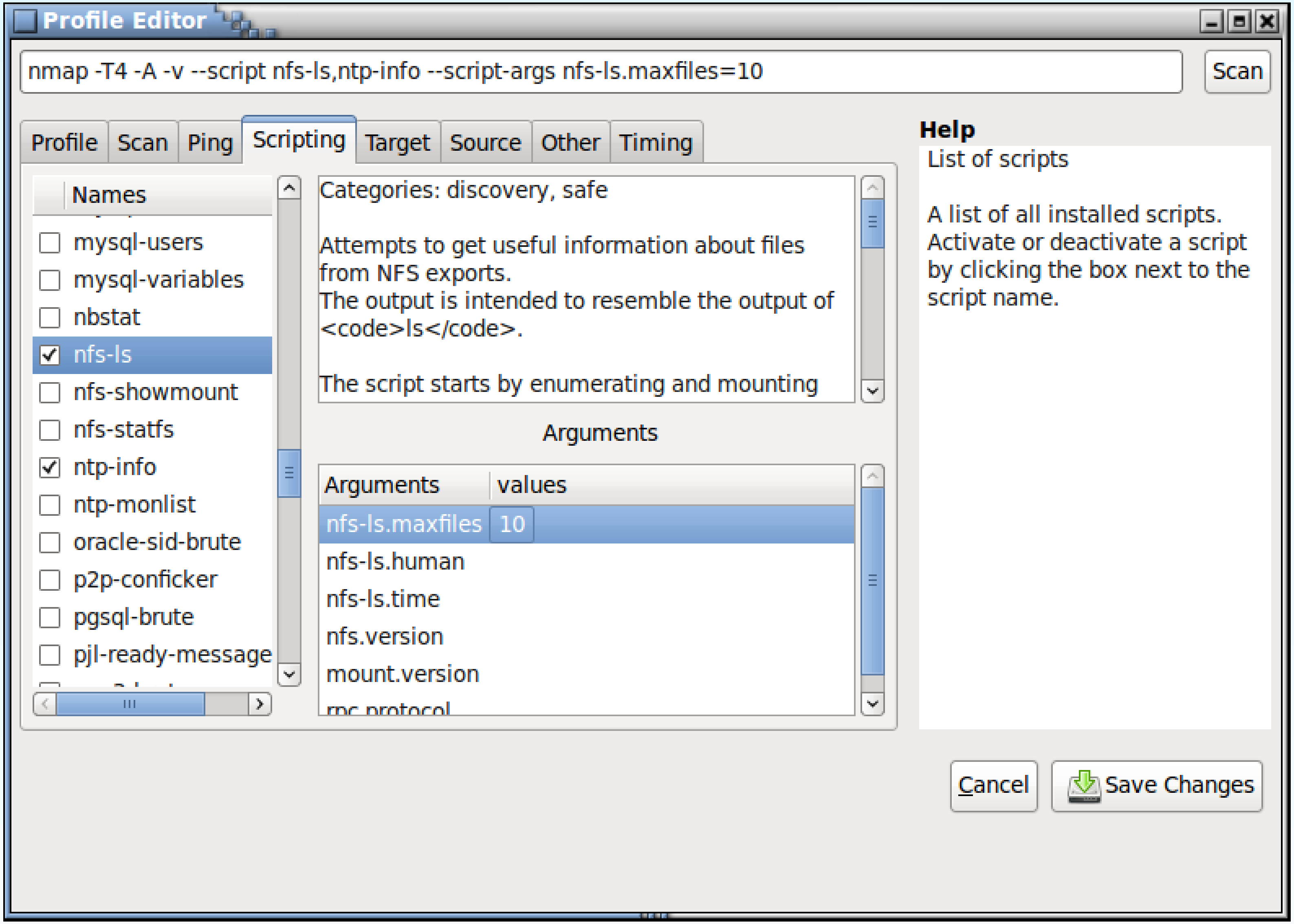
To turn http-brute into distribution-ready script, I would next

- expand the portrule to match more HTTP services,
- add script arguments to control the path retrieved and the method used,
- add NSEDoc @usage and @output examples, and
- let it cache credentials for other scripts to use.

What's Coming in NSE?

- Prerules & Postrules
- Target Acquisition Scripts
- Lots more scripts! Current queue:
  - Vnc-info (Patrik Karlsson)
  - Vnc-brute (Patrik Karlsson)
  - Svn-brute (Patrik Karlsson)
  - Hostmap (Ange Gutek)
  - Http-xst (Eduardo Garcia Melia)
  - Rmi-dumpregistry (Martin Swende)

Zenmap NSE Integration



```
nmap -T4 -A -v --script nfs-ls,ntp-info --script-args nfs-ls.maxfiles=10
```

Names

- □ mysql-users
- □ mysql-variables
- □ nbstat
- ☑ nfs-ls
- □ nfs-showmount
- □ nfs-statfs
- ☑ ntp-info
- □ ntp-monlist
- □ oracle-sid-brute
- □ p2p-conficker
- □ pgsql-brute
- □ pjl-ready-message

Categories: discovery, safe

Attempts to get useful information about files from NFS exports.
The output is intended to resemble the output of <code>ls</code>.

The script starts by enumerating and mounting

Arguments

Arguments	values
nfs-ls.maxfiles	10
nfs-ls.human	
nfs-ls.time	
nfs.version	
mount.version	
rpc.protocol	

Help

List of scripts

A list of all installed scripts. Activate or deactivate a script by clicking the box next to the script name.

Nmap Script Authors

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Final Notes

- Slides: http://insecure.org/presentations/
- Download Nmap from: http://nmap.org
- NSEDoc portal: http://nmap.org/nsedoc/
- NSE system docs: http://nmap.org/book/nse.html
- Q&A in Track #1 Q&A Room