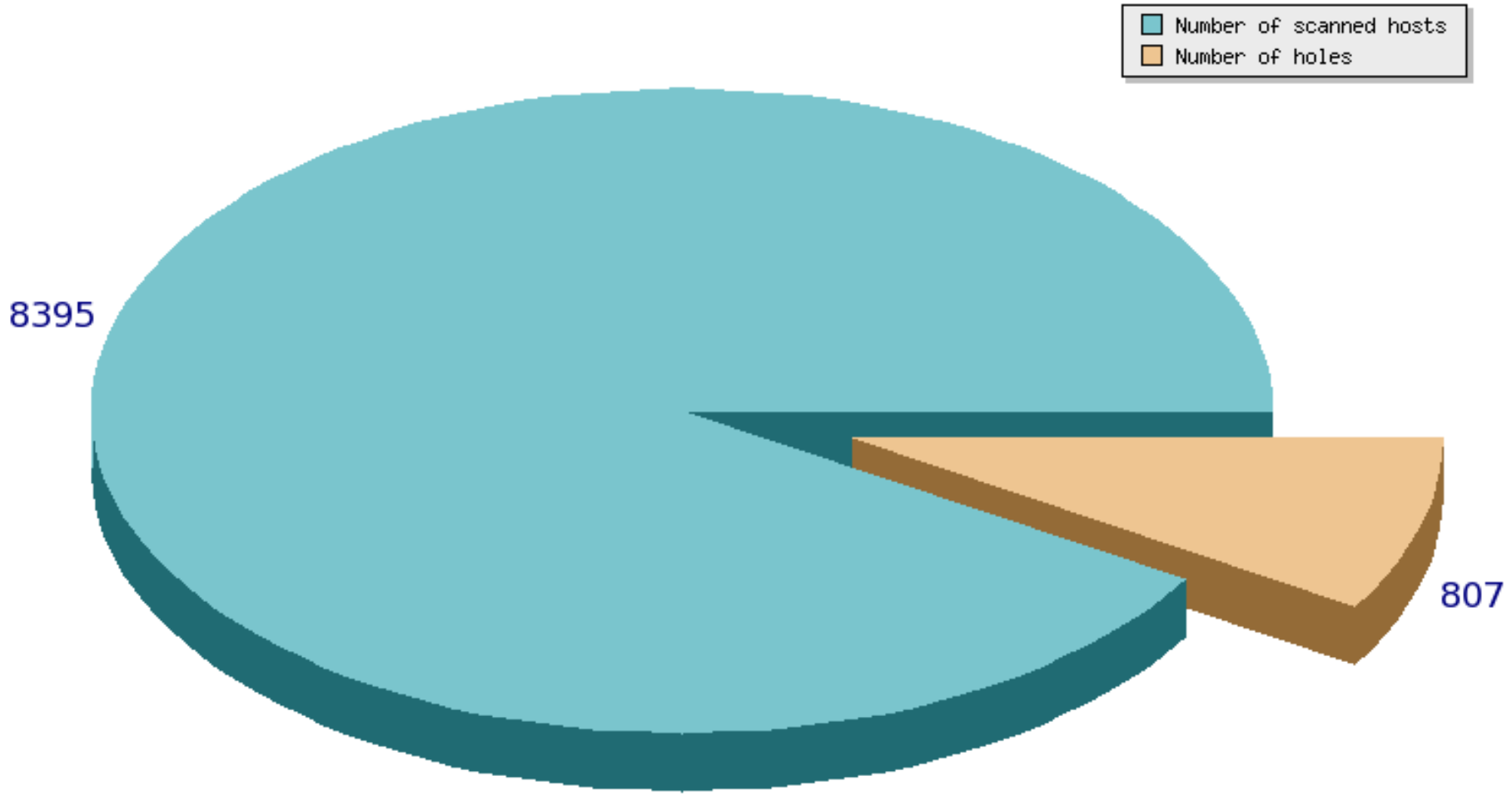
Pentest Debrief

Site Quarterly Pentest
¼ 07

Number of Devices Scanned vs. Number of Holes Found



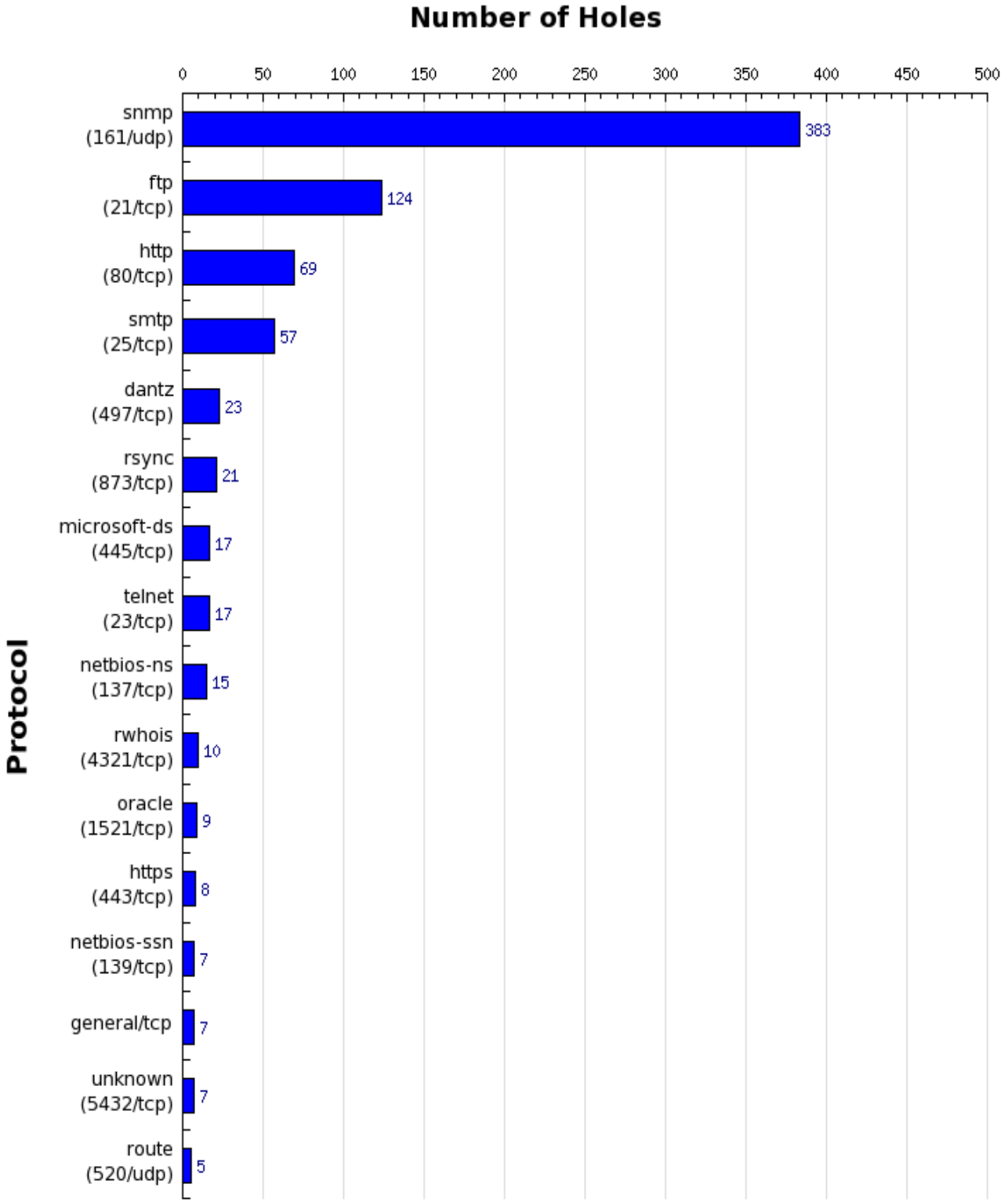
Number of hosts with at least one hole

570

or

~ 7 %

of nodes scanned



Total Number of Holes By Protocol (upper bound)

807 total holes

383	snmp
124	ftp
69	http
+17	telnet

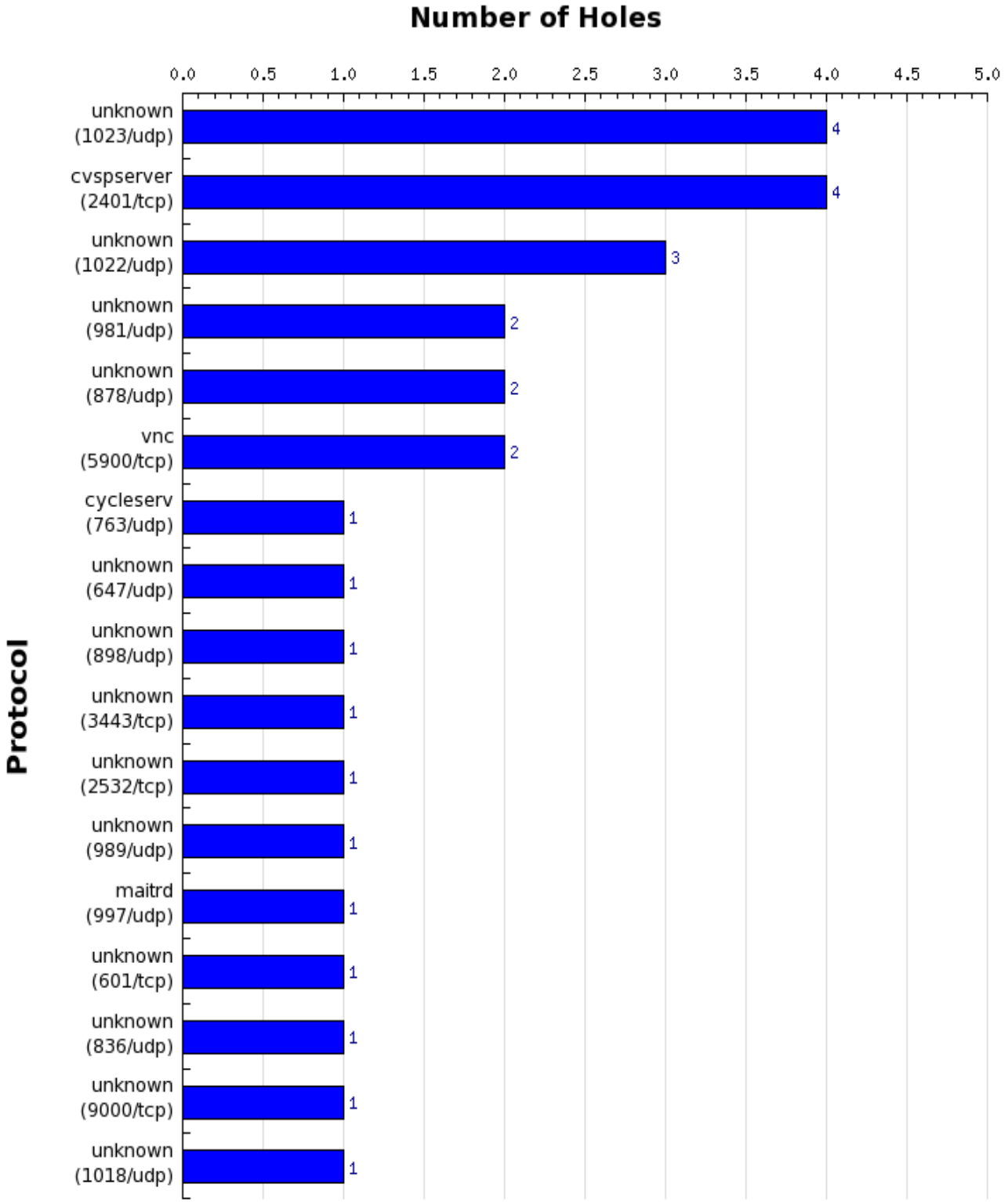
~ 593 were ...

... printers

Or

~ 75 %

of the reported holes



Total Number of Holes By Protocol (lower bound)

Printer Debrief

Oh but it's just paper

This is just downright annoying

It's just paper until it's your print job that is being backlogged due to someone sending a constant stream of garbage to the printer

Is Your Printer Out to Get You?

Non-PC network devices pose a growing threat to your data security

By Ira Victor

Your company has invested heavily in IT security. All the protections IT has recommended have been purchased and put in place. You feel confident that the company's electronic data is secure. But is it? What about all those non-PC networked devices lying around? Are they safe?

Printers, scanners, video cameras, anti-spam and anti-spyware appliances, VoIP devices, and other network-aware devices represent a growing threat. Many newer models of these devices are equipped with large hard drives (60GB or more), powerful Pentium processors, and versions of popular operating sys-

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anner's hard drive stores
ts output—output that may
copies of medical records,
account information or social
urity numbers.

The Non-PC Threat

Many organizations have purchased powerful firewalls, in-line

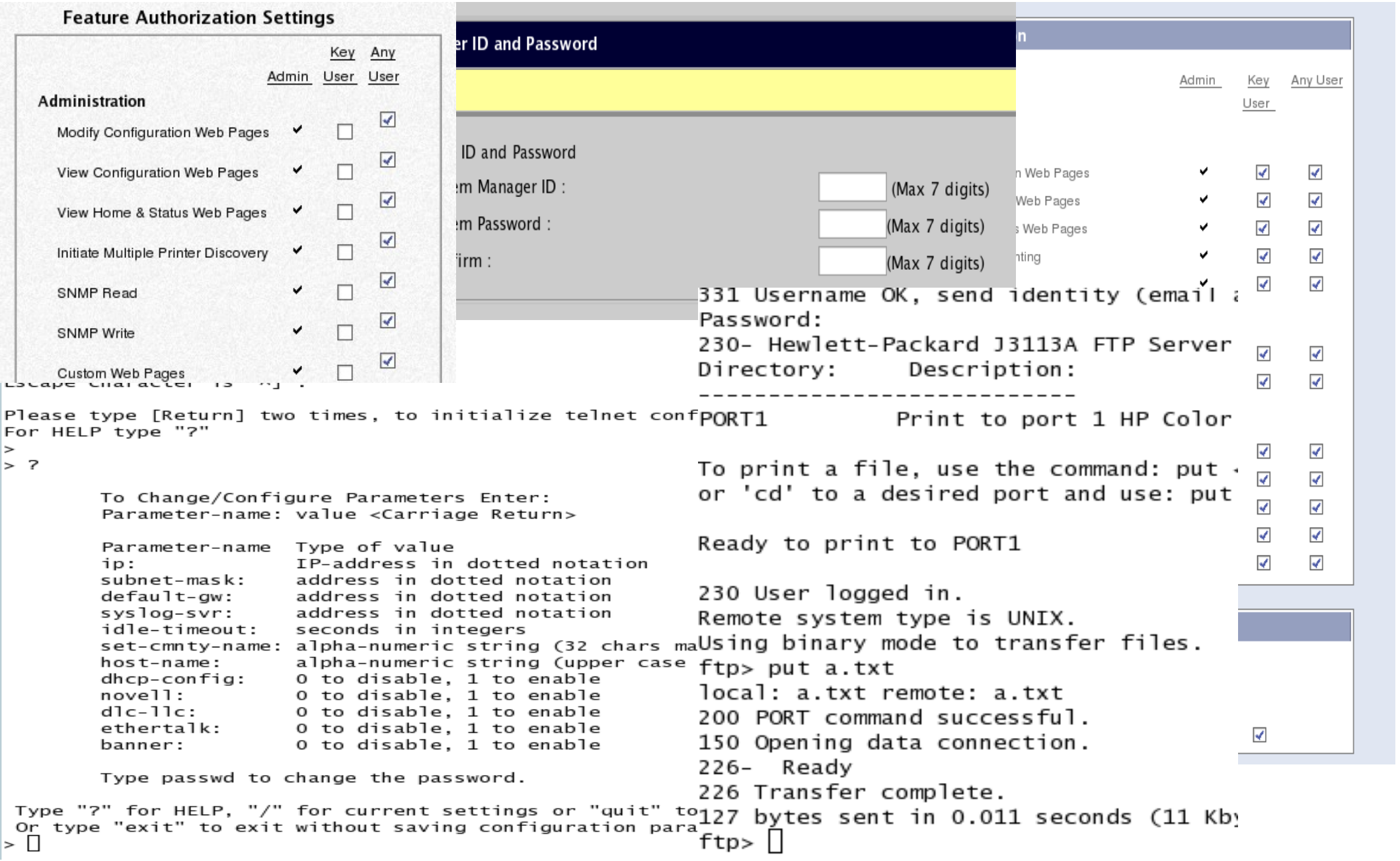
the outside, many newer devices are more like PCs on the inside.

Run a quick search on hacker and security Web sites, blogging sites, or underground IRC chat boards, and

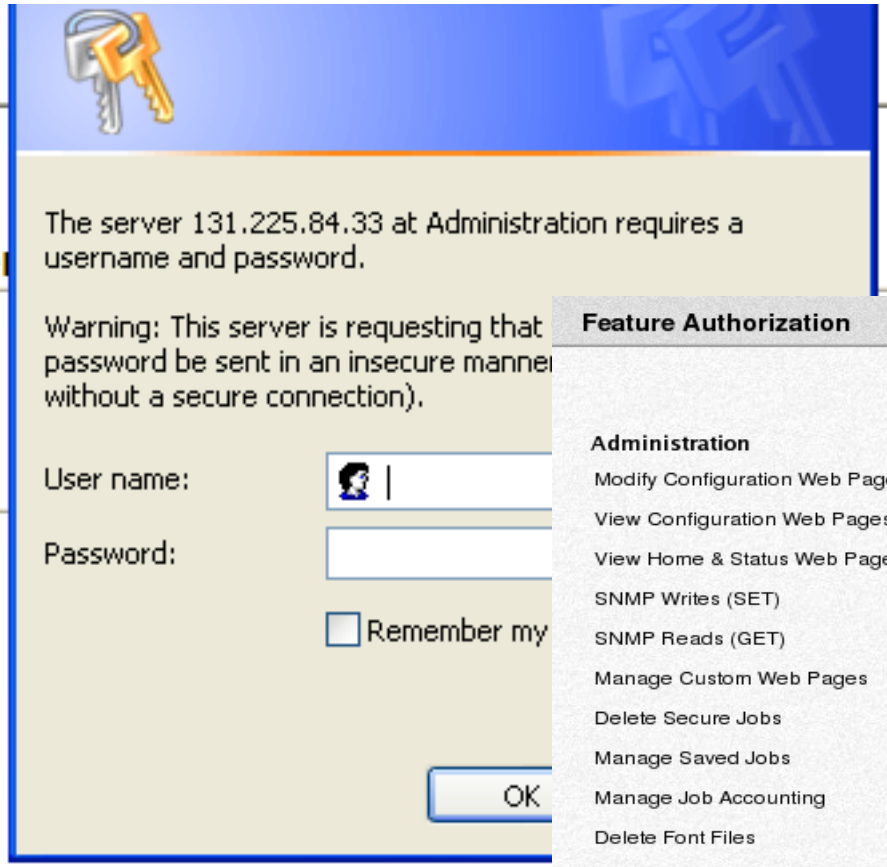
General Findings

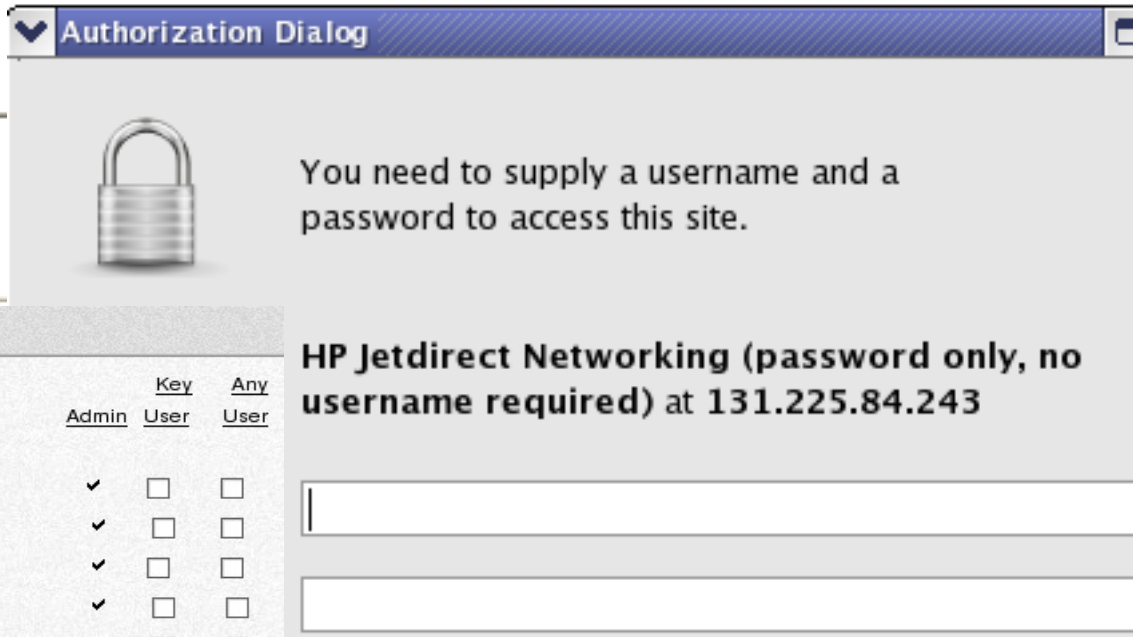
- ~600 printers
- 62 unauthenticated access via web
- ~40 more with unauthenticated access via telnet
- Last 2 numbers above are just on the second day. It doesn't include the counts from the first day
- Every device had default SNMP community strings

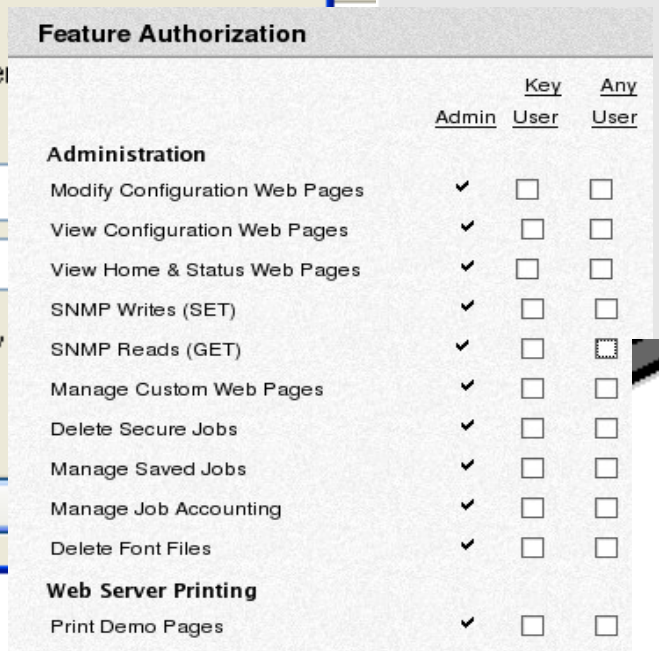
What does bad look like?



What does good look like?








```
[tarupp@catbot ~]$ telnet 131.225.84.33
Trying 131.225.84.33...
telnet: Unable to connect to remote host: Connection refused
[tarupp@catbot ~]$ ftp 131.225.84.33
ftp: connect: Connection refused
ftp> quit
```

SNMP

- Simple Network Management Protocol
- Generally not necessary that it be running on your device unless your devices are centrally managed with some other software
  - But this depends on the device!! I'm looking at you JetDirect...
- Can disclose sensitive data...

Like passwords

And system configuration

Passwords From SNMP

- 31 31 31 31 3D 31 30 38 3B
- 48 50 35 53 49 3D 31 30 38 3B
- 44 48 43 50 34 4D 45 3D 31 30 38 3B
- 55 53 4D 42 33 35 32 31 36 36 3D 31 30 38 3B
- 43 4F 4E 46 49 47 4A 44 31 37 30 3D 31 30 38 3B
- 48 44 54 56 33 32 3D 31 30 38 3B
- 42 4C 55 45 31 42 4F 58 3D 31 30 38 3B
- 43 4F 57 50 49 45 3D 31 30 38 3B
- 00 00 00 00 00 00 00 00 00 00 00

Whoops, I mean...

- 1111
- HP5SI
- DHCP4ME
- USMB352166
- CONFIGJD170
- HDTV32
- BLUE1BOX
- COWPIE
- empty password (there were lots of them)

demo: pull password from SNMP

System Configuration

Installed Software

```
HOST-RESOURCES-MIB::hrSWInstalledName.43 = STRING: "ed-0.2-36"
HOST-RESOURCES-MIB::hrSWInstalledName.44 = STRING: "groff-1.18.1.1-3.EL
HOST-RESOURCES-MIB::hrSWInstalledName.45 = STRING: "krb5-devel-1.3.4-33
HOST-RESOURCES-MIB::hrSWInstalledName.46 = STRING: "libpng-1.2.7-1.el4.
HOST-RESOURCES-MIB::hrSWInstalledName.47 = STRING: "libcroco-0.6.0-4"
HOST-RESOURCES-MIB::hrSWInstalledName.48 = STRING: "man-1.5o1-9.rhel4"
HOST-RESOURCES-MIB::hrSWInstalledName.49 = STRING: "Omni-0.9.1-7.1"
HOST-RESOURCES-MIB::hrSWInstalledName.50 = STRING: "mysql-4.1.20-1.RHEL
HOST-RESOURCES-MIB::hrSWInstalledName.51 = STRING: "bc-1.06-17.1"
HOST-RESOURCES-MIB::hrSWInstalledName.52 = STRING: "diskdumputils-1.3.1
HOST-RESOURCES-MIB::hrSWInstalledName.53 = STRING: "pyxf86config-0.3.19
HOST-RESOURCES-MIB::hrSWInstalledName.54 = STRING: "foundation-redhat-4
HOST-RESOURCES-MIB::hrSWInstalledName.55 = STRING: "psgml-1.2.5-4"
HOST-RESOURCES-MIB::hrSWInstalledName.56 = STRING: "lockdev-1.0.1-6.2"
HOST-RESOURCES-MIB::hrSWInstalledName.57 = STRING: "rpm-python-4.3.3-18
HOST-RESOURCES-MIB::hrSWInstalledName.58 = STRING: "sysreport-1.3.15-6"
HOST-RESOURCES-MIB::hrSWInstalledName.59 = STRING: "guile-1.6.4-14"
HOST-RESOURCES-MIB::hrSWInstalledName.60 = STRING: "docbook-style-dsssl
HOST-RESOURCES-MIB::hrSWInstalledName.61 = STRING: "gnutls-1.0.20-3.2.3
HOST-RESOURCES-MIB::hrSWInstalledName.62 = STRING: "libxml2-2.6.16-6"
HOST-RESOURCES-MIB::hrSWInstalledName.63 = STRING: "netpbm-progs-10.25-
HOST-RESOURCES-MIB::hrSWInstalledName.64 = STRING: "pilot-link-0.11.8-8
HOST-RESOURCES-MIB::hrSWInstalledName.65 = STRING: "xmlsec1-1.2.6-3"
HOST-RESOURCES-MIB::hrSWInstalledName.66 = STRING: "gnuplot-4.0.0-4"
```

System Configuration

Mountpoints; disk space

```
HOST-RESOURCES-MIB::hrDiskStorageCapacity.1536 = INTEGER: 78150744 KBy
HOST-RESOURCES-MIB::hrDiskStorageCapacity.1537 = INTEGER: 134217727 KB
HOST-RESOURCES-MIB::hrDiskStorageCapacity.1538 = INTEGER: 0 KBytes
HOST-RESOURCES-MIB::hrPartitionIndex.1536.1 = INTEGER: 1
HOST-RESOURCES-MIB::hrPartitionIndex.1536.2 = INTEGER: 2
HOST-RESOURCES-MIB::hrPartitionIndex.1536.3 = INTEGER: 3
HOST-RESOURCES-MIB::hrPartitionIndex.1537.1 = INTEGER: 1
HOST-RESOURCES-MIB::hrPartitionLabel.1536.1 = STRING: "/dev/hda1"
HOST-RESOURCES-MIB::hrPartitionLabel.1536.2 = STRING: "/dev/hda2"
HOST-RESOURCES-MIB::hrPartitionLabel.1536.3 = STRING: "/dev/hda3"
HOST-RESOURCES-MIB::hrPartitionLabel.1537.1 = STRING: "/dev/hdb1"
```

```
HOST-RESOURCES-MIB::hrFSMountPoint.1 = STRING: "/"
HOST-RESOURCES-MIB::hrFSMountPoint.2 = STRING: "/sys"
HOST-RESOURCES-MIB::hrFSMountPoint.3 = STRING: "/proc/bus/usb"
HOST-RESOURCES-MIB::hrFSMountPoint.4 = STRING: "/export/home"
HOST-RESOURCES-MIB::hrFSMountPoint.5 = STRING: "/rest"
HOST-RESOURCES-MIB::hrFSMountPoint.6 = STRING: "/proc/sys/fs/binfmt_
HOST-RESOURCES-MIB::hrFSMountPoint.7 = STRING: "/var/lib/nfs/rpc_pip
HOST-RESOURCES-MIB::hrFSMountPoint.8 = STRING: "/proc/fs/nfsd"
HOST-RESOURCES-MIB::hrFSMountPoint.9 = STRING: "/mnt"
```

System Configuration

Processes

```
HOST-RESOURCES-MIB::hrSWRunPath.210 = STRING: "kseriod"
HOST-RESOURCES-MIB::hrSWRunPath.321 = STRING: "kjournald"
HOST-RESOURCES-MIB::hrSWRunPath.1237 = STRING: "udevd"
HOST-RESOURCES-MIB::hrSWRunPath.1449 = STRING: "kauditd"
HOST-RESOURCES-MIB::hrSWRunPath.1513 = STRING: "kmirrord"
HOST-RESOURCES-MIB::hrSWRunPath.1557 = STRING: "kjournald"
HOST-RESOURCES-MIB::hrSWRunPath.1558 = STRING: "kjournald"
HOST-RESOURCES-MIB::hrSWRunPath.2058 = STRING: "/opt/rocks/bin/python"
HOST-RESOURCES-MIB::hrSWRunPath.2069 = STRING: "syslogd"
HOST-RESOURCES-MIB::hrSWRunPath.2073 = STRING: "klogd"
HOST-RESOURCES-MIB::hrSWRunPath.2084 = STRING: "irqbalance"
HOST-RESOURCES-MIB::hrSWRunPath.2094 = STRING: "portmap"
HOST-RESOURCES-MIB::hrSWRunPath.2114 = STRING: "rpc.statd"
HOST-RESOURCES-MIB::hrSWRunPath.2144 = STRING: "rpc.idmapd"
HOST-RESOURCES-MIB::hrSWRunPath.2311 = STRING: "/usr/sbin/automount"
HOST-RESOURCES-MIB::hrSWRunPath.2359 = STRING: "/usr/sbin/automount"
HOST-RESOURCES-MIB::hrSWRunPath.2374 = STRING: "/usr/sbin/smartd"
HOST-RESOURCES-MIB::hrSWRunPath.2384 = STRING: "/usr/sbin/acpid"
HOST-RESOURCES-MIB::hrSWRunPath.2405 = STRING: "/usr/sbin/sshd"
HOST-RESOURCES-MIB::hrSWRunPath.2491 = STRING: "rpc.rquotad"
HOST-RESOURCES-MIB::hrSWRunPath.2508 = STRING: "nfsd"
HOST-RESOURCES-MIB::hrSWRunPath.2509 = STRING: "nfsd"
HOST-RESOURCES-MIB::hrSWRunPath.2510 = STRING: "nfsd"
HOST-RESOURCES-MIB::hrSWRunPath.2511 = STRING: "nfsd"
HOST-RESOURCES-MIB::hrSWRunPath.2512 = STRING: "nfsd"
HOST-RESOURCES-MIB::hrSWRunPath.2513 = STRING: "nfsd"
HOST-RESOURCES-MIB::hrSWRunPath.2514 = STRING: "nfsd"
HOST-RESOURCES-MIB::hrSWRunPath.2515 = STRING: "nfsd"
HOST-RESOURCES-MIB::hrSWRunPath.2516 = STRING: "lockd"
HOST-RESOURCES-MIB::hrSWRunPath.2517 = STRING: "rpciod"
HOST-RESOURCES-MIB::hrSWRunPath.2521 = STRING: "rpc.mountd"
HOST-RESOURCES-MIB::hrSWRunPath.2676 = STRING: "crond"
HOST-RESOURCES-MIB::hrSWRunPath.2707 = STRING: "xfs"
HOST-RESOURCES-MIB::hrSWRunPath.2726 = STRING: "/usr/sbin/atd"
HOST-RESOURCES-MIB::hrSWRunPath.2742 = STRING: "dbus-daemon-1"
HOST-RESOURCES-MIB::hrSWRunPath.2752 = STRING: "cups-config-daemon"
HOST-RESOURCES-MIB::hrSWRunPath.2756 = STRING: "/usr/sbin/snmpd"
HOST-RESOURCES-MIB::hrSWRunPath.2763 = STRING: "hald"
```

Cmon, where's the risk?

- It's not about getting root
- Because I can embarrass the heck out of your organization and abuse your resources
  - Software/music/image drops
  - Upload my own watermarks, so I can include inappropriate content in everything that is printed...use your imagination.
  - Change your print banners
  - FTP bounce attacks so I can scan behind your firewalls
- Provides valuable reconnaissance info for use in larger attacks

demo: FTP bounce

Being a jerk

- cat /dev/hda | nc -c 192.168.1.2 9100
- FTP your swapfile to the printer
- Change the LCD display
- nmap -P0 -sI printer_ip target_ip
- telnet localhost 19 | nc printer_ip 9100

So what do you recommend we do then?

- Disable unnecessary services and protocols if possible
- Ask Data Comm to filter services that cannot be disabled
- Get rid of your old printers. Yeah, I said it

If you're feeling geeky

- http://www.irongeek.com/i.php?page=security/networkprinterhacking
- yum install net-snmp-utils

  provides snmpget and snmpwalk
- telnet to your printer and see what I saw
- decode your own hex

  http://nickciske.com/tools/hex.php

Further Reading

- Information and Recommendations for Securing Printers on Site
  - CD-DocDB # 2072
  - KCA required to view
  - Additions and corrections welcome

Questions?