

Capsicum working group summary



Capsicum

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Capsicum

- Lightweight operating system capability and sandbox framework
 - Kernel features appear in FreeBSD 9.0
 - Application compartmentalisation
 - Supplements existing DAC/MAC
- Collaboration between Cambridge, Google



Working group goals

- Capability ioctl whitelists
- Sandboxed DNS and other services
- Migrating to *privilege upgrade* from *privilege downgrade*
- Updating Chromium patches
- libcapsicum
- 9.1 agenda
- connectat(), bindat()
- pdwait()
- Brainstorm applications to compartmentalise



ioctl white-listing

- Motivation: pjd's work on hastd
- ioctl is message passing
 - Thousands of calls with diverse semantics
 - Can't interpret at system call boundary
- Currently we have CAP_IOCTL
 - Idea: add white list table
 - Only white-listed ioctls available without CAP_IOCTL
- Discussion: masks, groups, ...
- Conclusion: keep it simple for now



Missing system calls

- `bindat()`, `connectact()`
- `[f]chflagsat()`
- `pdtrace()`
 - What about `pdwait4()`?
 - Can we lose reparenting?



Other system features

- Socket option white-listing
- fcntl white-listing
- cwd as a capability
- close-on-exec for process descriptors
- Kill on ECAPMODE
- Core dumping to descriptor/socket



Services to offer to sandboxes

- Capsicum Services Daemon (CSD) -- launchd?
- Services for (and in) sandboxes
 - sysctl -- think compartmentalised netstat/sockstat/top/...
 - DNS, DNSSEC
 - Sockets, files ... ftsat(3)?
 - SSL client/server
 - Authentication services
 - Various nsd services (or not)
- Requires us to clean up Capsicum's fdlist but good starting point



FreeBSD things to sandbox

rpcbind, mountd

SSH client, server

libfetch

libarchive (bsdtar)

zlib (gzip)

ftpd, tftpd

bootpd

inetd

netcat

syslogd

wpa_supplicant

all setuid binaries

snmpd

trnsold, routed, ...

named

ntpd

lwresd

Kerberos, kadmind

rwhod

file, libmagic

finger, fingerd

openssl

grep, awk, head,
tail, ...

bc

man

od/hexdump

csup

pkgng



Ports we want sandboxed*

- KDE - IO slaves
- PDF viewer! (xpdf?)
- BIND
- Apache
- Sendmail
- Chromium (update)
- nginx
- Unbound
- Varnish
- Mozilla
- lighttpd
- ImageMagick
- Subversion
- git
- Dovecot
- OpenLDAP
- Cyrus
- Spamassassin
- ClamAV
- mplayer

* notice aggressive use of passive voice



The plan

- 9.0: features present but not in GENERIC
- 9.1: Enable in GENERIC!
 - libcapsicum(3), csd(8)
 - Selected security-critical applications
 - SSH, dhclient, tcpdump, BIND, inetd, ...

