Chapter 21
Security

Firewall

- FreeBSD firewalls
  - ipfw -- IP firewall and traffic shaper control program
    - ipfw(8)
  - ipf (IP Filter) - alters packet filtering lists for IP packet input and output
    - ipf(8)
  - pf -- packet filter
    - pf(4)

http://www.freebsd.org/doc/en/books/handbook/firewalls.html

Firewall (1)

- Using ipfw
  1. Add these options in kernel configuration file and recompile the kernel

```
options     IPFIREWALL
options     IPFIREWALL_VERBOSE
options     IPFIREWALL_FORWARD
options     IPFIREWALL_DEFAULT_TO_ACCEPT
```

  2. Edit /etc/rc.conf to enable firewall
     - "firewall" keyword in rc.conf

```
# firewall
firewall_enable="YES"
firewall_script="/etc/firewalls/rules"
firewall_quiet="YES"
```

Firewall (2)

3. Edit ipfw command script that you specify in rc.conf
   - Ex: /etc/firewall/rules

- ipfw command
  - # ipfw list (show current firewall rules)
  - # ipfw flush (delete all firewall rules)
  - # ipfw add {pass | deny} {udp | tcp | all} from where to where

Firewall (3)

- Example (Head part)

```
#!/bin/sh

fwcmd="/sbin/ipfw -q“
myip=“140.113.17.215”
${fwcmd} -f flush

${fwcmd} add pass all from ${myip} to any

# Allow TCP through if setup succeeded
${fwcmd} add pass tcp from any to any established
${fwcmd} add deny log all from any to any frag
echo -n "Established “

# Allow icmp (ping only)
${fwcmd} add pass icmp from any to any icmptypes 0,3,8,11
```

icmp(4)

Firewall (4)

- Example (service part)

```
# Allow Samba
${fwcmd} add pass tcp from 140.113.17.0/24 to ${myip} 137-139 setup
echo -n "Samba "

# Allow HTTP/HTTPS
${fwcmd} add pass tcp from any to ${myip} 80 setup
${fwcmd} add pass tcp from any to ${myip} 443 setup
echo -n "HTTP/HTTPS "

# SSH
${fwcmd} add pass tcp from any to any 22 setup
echo -n "SSH "

# open any system port that your system provide
```

Firewall (5)

- Example (Tail part)

```
# Default to deny
${fwcmd} add 65500 reset log tcp from any to any
${fwcmd} add 65501 reject udp from any to any
${fwcmd} add 65502 reject log icmp from any to any
${fwcmd} add 65534 deny log all from any to any
```

Firewall (6)

- Manual reset firewall rules
  - Edit the script and
  - # sh /etc/firewall/rules
- When you install new service and wondering why it can not use...
  - # ipfw flush
  - Delete all firewall rules to remove problems caused by firewall

Firewall (7)

- Debug your system via log file
  - /var/log/security

```
Dec 25 11:25:36 sabsd last message repeated 2 times
Dec 25 11:45:06 sabsd kernel: ipfw: 65500 Reset TCP 211.48.52.58:1997 140.113.17.215:5554 in via fxp0
Dec 25 11:45:07 sabsd kernel: ipfw: 65500 Reset TCP 211.48.52.58:1997 140.113.17.215:5554 in via fxp0
Dec 25 11:45:07 sabsd kernel: ipfw: 65500 Reset TCP 211.48.52.58:4062 140.113.17.215:1023 in via fxp0
Dec 25 11:45:08 sabsd kernel: ipfw: 65500 Reset TCP 211.48.52.58:4062 140.113.17.215:1023 in via fxp0
Dec 25 11:45:09 sabsd kernel: ipfw: 65500 Reset TCP 211.48.52.58:4246 140.113.17.215:9898 in via fxp0
Dec 25 12:05:44 sabsd kernel: ipfw: 65500 Reset TCP 204.100.126.30:2188 140.113.17.215:445 in via fxp0
Dec 25 12:05:45 sabsd last message repeated 2 times
```

Configuration Examples

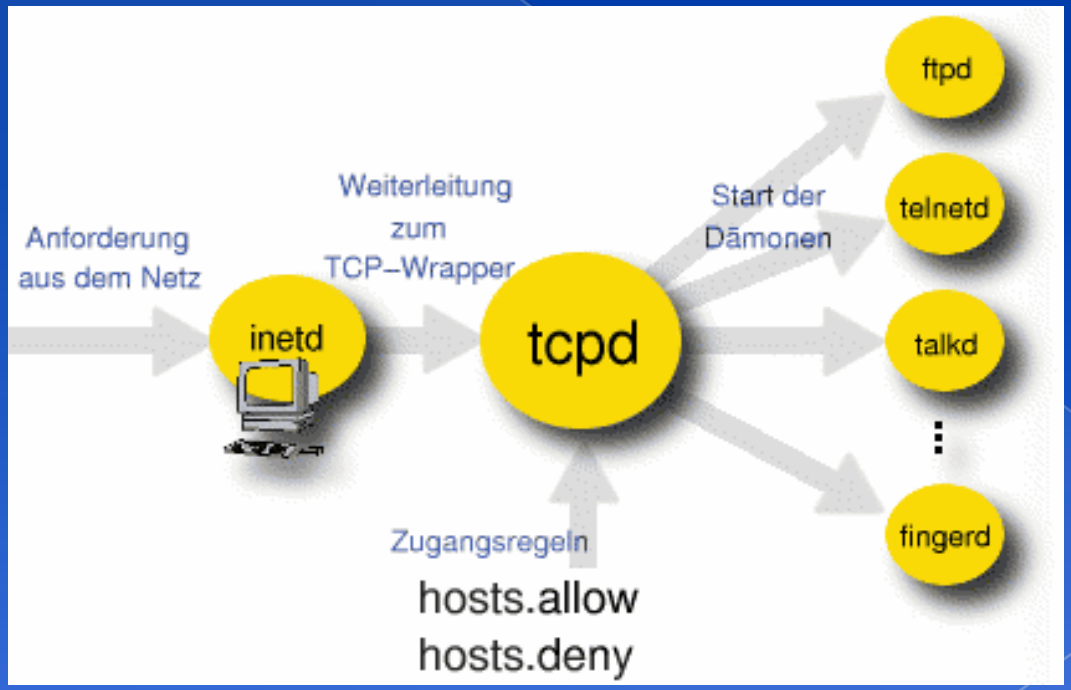
- /usr/share/examples
- ipfw/
  - /usr/share/examples/ipfw/change_rules.sh
- ipfilter/
- pf/

/etc/hosts.equiv and ~/.rhosts

- Trusted remote host and user name DB
  - Allow user to login (via rlogin) and copy files (rcp) between machines without passwords
  - Format:
    - Simple: hostname [username]
    - Complex: [+-][hostname | @netgroup]
      [[+-][username | @netgorup]]
  - Example
    - bar.com foo (trust user "foo" from host "bar.com")
    - +@adm_cs_cc (trust all from amd_cs_cc group)
    - +@adm_cs_cc -@chwong
- Do not use this unless you know what you are doing exactly

/etc/hosts.allow (1)

- TCP Wrapper
  - Provide support for every server daemon under its control



/etc/hosts.allow (2)

- To see what daemons are controlled by inetd, see /etc/inetd.conf

```
#ftp    stream  tcp     nowait  root    /usr/libexec/ftpd       ftpd -l
#ftp    stream  tcp6    nowait  root    /usr/libexec/ftpd       ftpd -l
#telnet stream  tcp     nowait  root    /usr/libexec/telnetd    telnetd
#telnet stream  tcp6    nowait  root    /usr/libexec/telnetd    telnetd
shell   stream  tcp     nowait  root    /usr/libexec/rshd       rshd
#shell  stream  tcp6    nowait  root    /usr/libexec/rshd       rshd
login   stream  tcp     nowait  root    /usr/libexec/rlogind    rlogind
#login  stream  tcp6    nowait  root    /usr/libexec/rlogind    rlogind
```

- TCP wrapper should not be considered a replacement of a good firewall. Instead, it should be used in conjunction with a firewall or other security tools

/etc/hosts.allow (3)

- To use TCP wrapper
  1. inetd daemon must start up with "-Ww" option (default)

     Or edit /etc/rc.conf

```
inetd_enable="YES"
inetd_flags="-wW"
```

  - Edit /etc/hosts.allow
    - Format:

      daemon : address : action

      - daemon is the daemon name which inetd started
      - address can be hostname, IPv4 addr, IPv6 addr
      - action can be "allow" or "deny"

      - Keyword "ALL" can be used in daemon and address fields to means everything

/etc/hosts.allow (4)

- First rule match semantic
  - Meaning that the configuration file is scanned in ascending order for a matching rule
  - When a match is found, the rule is applied and the search process will stop
- Example:

```
ALL: localhost, loghost @adm_cc_cs : allow
sshd : @sun_cc_cs, @bsd_cc_cs, @linux_cc_cs : allow
identd : ALL : allow
rpcbind : 140.113.209. 140.113.235. 140.113.23. .cs.nctu.edu.tw : allow
rpc.rstatd rpc.rusersd : 140.113.209. 140.113.235. 140.113.23. : allow
rpc.lockd rpc.statd : 140.113.209. 140.113.235. 140.113.23. : allow
mountd : 140.113.209. 140.113.235. 140.113.23. : allow
rpc.rusersd : @all_cc_cs 140.113.17.203: allow
ALL : ALL : deny
```

/etc/hosts.allow (5)

- Advance configuration
  - External commands (twist option)
    - twist will be called to execute a shell command or script

```
# The rest of the daemons are protected.
telnet : ALL \
         : severity auth.info \
         : twist /bin/echo "You are not welcome to use %d from %h."
```

  - External commands (spawn option)
    - spawn is like twist, but it will not send a reply back to the client

```
# We do not allow connections from example.com:
ALL : .example.com \
      : spawn (/bin/echo %a from %h attempted to access %d >> \
      /var/log/connections.log) \
      : deny
```

/etc/hosts.allow (6)

- Wildcard (PARANOID option)
  - Match any connection that is made from an IP address that differs from its hostname

```
# Block possibly spoofed requests to sendmail:
sendmail : PARANOID : deny
```

hosts_access(5)
hosts_options(5)

FreeBSD security function

- FreeBSD Security Information
  - http://security.freebsd.org/
  - http://www.freebsd.org/security/advisories.html
- Security Notifications List
  - freebsd-security-notifications@freebsd.org
- See supplicant:
  - “The FreeBSD Security Officer function”
    - http://people.freebsd.org/~simon/presentations/