Automount NFS

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交大資工系資訊中心

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Automatic mounting

- Problems of /etc/fstab
  - Maintenance of /etc/fstab in a large network
  - Crashed NFS server will make operation blocked
  - Removable media support
- automounter (autofs) daemon
  - Mount filesystems when they are referenced and unmount them when they are no longer needed
  - Supply a list of replicated filesystems as backup of important resource
  - Transparent to users

Automounter

- Products
  - 1988, automount (from Sun), simple and concise (Solaris & other Unix-like)
  - 1989, amd (from Jan-Simon Pendry), a.k.a. Berkeley Automounter, complicated but more powerful (*BSD and Linux, Obsoleted now)
  - 2014, autofs, starting with FreeBSD 10.1-RELEASE it has a new automounter very similar to the Solaris/Linux one

autofs (1)

- autofs
  - Kernel component: autofs(5)
  - Userspace applications
    - automount(8): Update autofs mounts
    - automountd(8): Daemon handling autofs mount requests
    - autounmountd(8): Daemon unmounting automounted filesystems
- Three kinds of configuration files (map)
  - Direct map
  - Indirect map   Provide information about filesystems
  - Master map   that are to be automounted
    - List which direct and indirect maps that automount should pay attention to
  - Difference between direct and indirect
    - All mount points in indirect map has common directory defined in master map
- https://www.freebsd.org/doc/handbook/network-nfs.html#network-autofs

autofs (2)

- Example of auto_master and map file ([auto_master(5)](#))

master	mountpoint	map_name	[-options]	
	`/net`	`/etc/auto.net`	`-rw, intr`	(indirect)
	`/-`	`/etc/auto.direct`	`-ro, intr`	(direct)
	`+autofs.map`			(include NIS map)

	key	[-options]	location
direct	`/data/redi`	`-rw,soft,nosuid`	`storage:/redis`
	`/data/mysql`		`storage:/mysql`
indirect	`www`	`-rw,soft,nosuid,vers=2`	`web0:/home/www`
	`mail`	`-rw,soft,nosuid,quota`	`ccserv:/spool/mail`
	`ftp`	`-ro,soft,nosuid`	`ftp:/home/ftp`
	`*`	`-intr,nfsv4`	`192.168.1.1:/share/&`
	`sys`		`dragon:/sys/${OSNAME}`

`*` : match any unmatched key
`&` : replaced by matched key field

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autofs (3)

Selector	Description
ARCH	Expands to the output of uname -p
CPU	Same as ARCH
HOST	Expands to the output of uname -n
OSNAME	Expands to the output of uname -s
OSREL	Expands to the output of uname -r
OSVERS	Expands to the output of uname -v
&	Volume name being resolved

● Additional variable can be defined with the -D flag of automount(8) and automountd(8)

autofs (4)

- Master map
  - /etc/auto_master

    (FreeBSD)
  - /etc/auto.master

    (Linux)
  - /etc/auto_master

    (Solaris)
- Restart automounter when you change the maps
  - /etc/rc.d/automount {start|stop}
  - /etc/rc.d/automountd {start|stop}   (FreeBSD)
  - /etc/rc.d/autounmountd {start|stop}

autofs (5)

- autofs in FreeBSD

```
/etc/rc.conf
…
autofs_enable="YES"
…
```

- Example after mounting maps

```
$ mount -t autofs
map -hosts on /net (autofs)
map /etc/auto.mnt on /mnt (autofs)
```

autofs (6)

- Replicated filesystems
  - There are several identical NFS and we want to mount anyone of them
  - Constraints
    - Read-only
    - These replicated filesystems should be truly identical
  - Automounter will choose a server based on its own idea of which one is the best

```
/usr/man     -ro    bsd1:/usr/man bsd2:/usr/man
/www/data    -ro    web1,web2:/www/data
```

autofs (7)

- Automatic automounts
  - **automount** can query the **mountd** to find out what filesystems the server exports
  - Using -host as map name in the master map file

    ```
    /net    -host    -nosuid,soft
    ```

  - -host does not enumerate all possible hosts
    - It waits for individual subdirectory names to be referenced
    - If bsd1 exports **/usr/share/man**
      - Automount at the path **/net/bsd1/usr/share/man**