FOSDEM 2020

VUOS: Give Your Processes a New VU

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Process View

VUOS

User Space

Kernel Space

NAMESPACES

Bare Linux View
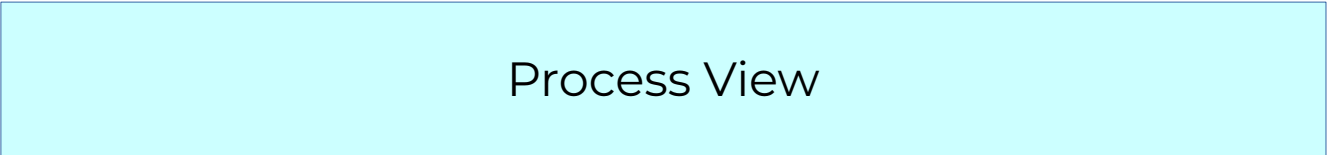
What VUOS can do...

- File system mount (vufuse)
- Virtual devices (vudev)
- Virtual network stacks (vunet)
- File system patchworking (vufs)
- Uname/Time (vumisc)
- Virt uid/gid (unrealuidgid)

Mount a File System

```
$ umvu xterm
…

$ vu_insmod vufuse
$ vumount -t vufuseext2 -o rw+ /tmp/linux.img /tmp/mnt
$ ls /tmp/mnt
bin  boot  dev  etc  lib  lost+found  mnt  proc  sbin  tmp  usr


…
$ vuumount /tmp/mnt
```

Create a RAMDISK and mount it

```
$ umvu xterm
…
$ vu_insmod vufuse vudev
$ vumount -t vudevramdisk -o size=100M none /dev/ramdisk
$ /sbin/mkfs.ext3 /dev/ramdisk
mke2fs 1.45.5 (07-Jan-2020)
warning: Unable to get device geometry for /dev/ramdisk
Creating filesystem with 32768 1k blocks and 8192 inodes
Filesystem UUID: 9492a349-6835-4adc-944e-6a19df47999f
Superblock backups stored on blocks:
        8193, 24577

Allocating group tables: done
Writing inode tables: done
Creating journal (4096 blocks): done
Writing superblocks and filesystem accounting information: done

$ vumount -t vufuseext2 -o rw+ /dev/ramdisk /mnt
$ ls -l /mnt
total 12
drwx------ 2 root root 12288 Jan 27 12:00 lost+found
$
```

Mount a partition of a disk image
(e.g. from a Raspberry PI disk image)

```
$ umvu xterm
…
$ vu_insmod vufuse vudev
$ vumount -t vudevpartx \
  /tmp/2019-09-26-raspbian-buster-lite.img /dev/sdx
$ vumount -t vufuseext2 /dev/sdx2 /mnt
$ ls /mnt
bin    dev    home   lost+found   mnt   proc   run    srv   tmp   var
boot   etc    lib    media        opt   root   sbin   sys   usr
```

Run a virtual net stack connected to vde

```
$ vu_insmod vunet
$ vumount -t vunetvdestack vde:// /dev/net/slirp
$ vustack /dev/net/slirp bash
$$ ip addr add 192.168.250.24/24 dev vde0
$$ ip link set vde0 up
$$ ip addr
1: lo: <LOOPBACK> mtu 65536 …
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
2: vde: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 …
    link/ether 4a:ea:92:31:b8:50 brd ff:ff:ff:ff:ff:ff
    inet 192.168.250.24/24 scope global vde0

$$ busybox ping 192.168.250.1
PING 192.168.250.1 (192.168.250.1): 56 data bytes
64 bytes from 192.168.250.1: seq=0 ttl=64 time=0.944 ms
64 bytes from 192.168.250.1: seq=1 ttl=64 time=1.693 ms
```

Run a virtual net stack connected to slirp
(using picotcp – still experimental)

```
$ vu_insmod vunet
$ vumount -t vunetpicox slirp:// /dev/net/picox
$ vustack /dev/net/picox bash
$$ /sbin/udhcpc -i vde0
udhcpc: started, v1.30.1
/etc/udhcpc/default.script: 60: resolvconf: not found
udhcpc: sending discover
udhcpc: sending select for 10.0.2.15
udhcpc: lease of 10.0.2.15 obtained, lease time 86400
$$ ip addr
2090479455: loop: <UP> mtu 1500
    link/netrom 00:00:00:00:00:00 brd ff:ff:ff:ff:ff:ff
    inet 127.0.0.1/8 scope global dynamic
    inet6 ::1/128 scope host dynamic
2090826452: vde0: <UP> mtu 1500
    link/netrom 80:00:6b:8b:45:67 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/8 scope global dynamic
```
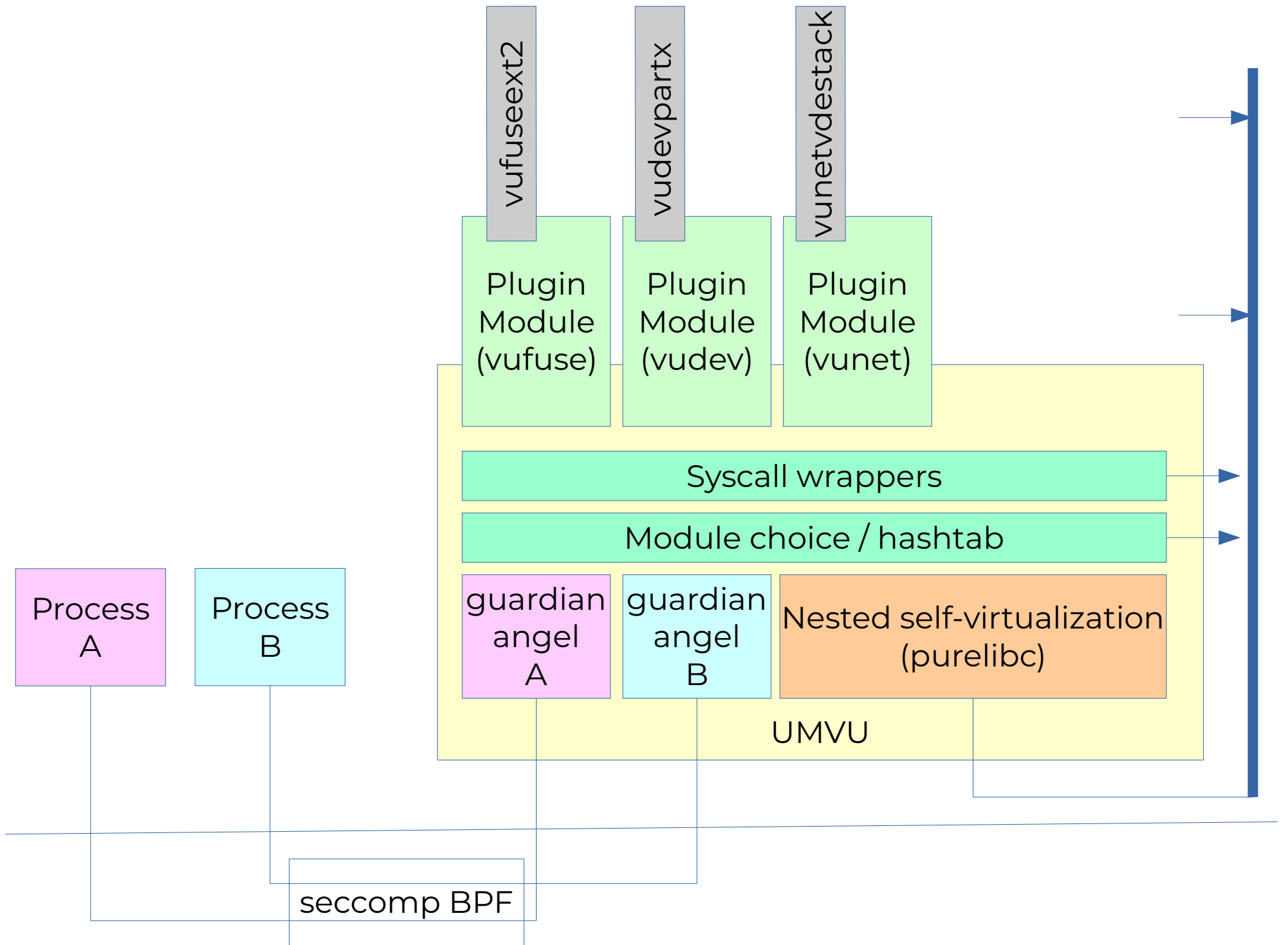
Remount /etc/ in COW mode

```
renzo$ mkdir /tmp/cowetc
renzo$ vumount -t vufs -o cow /tmp/cowetc /etc
renzo$ chmod 644 /etc/passwd
renzo$ sed -e '/^renzo/d' -i /etc/passwd
renzo$ bash
I have no name! $
```

Change the pace of time

```
$ xclock -update 1 &
$ umvu xterm
…
$ vu_insmod vumisc
$ xclock -update 1 &
$ vumount -t vumisctime none /mnt
$ echo 2 > /mnt/frequency
$
```
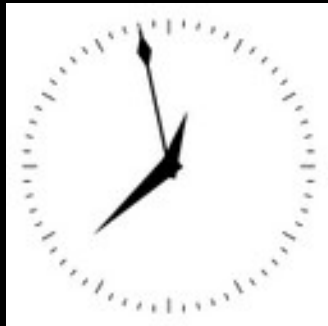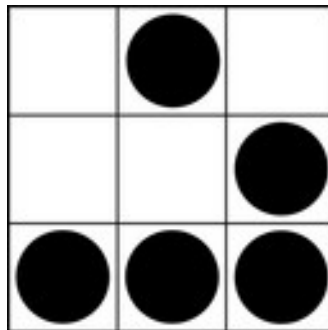
Further info

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We are still creating art and beauty on a computer:

the art and beauty of revolutionary ideas translated into (libre) code...

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