Netkit4TIC lab

Name	serial
Version	1.0
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Web	http://www.tic.fdns.net/tic/html/lab.html
Description	configuring serial lines, connect them together with minicom or with pppd

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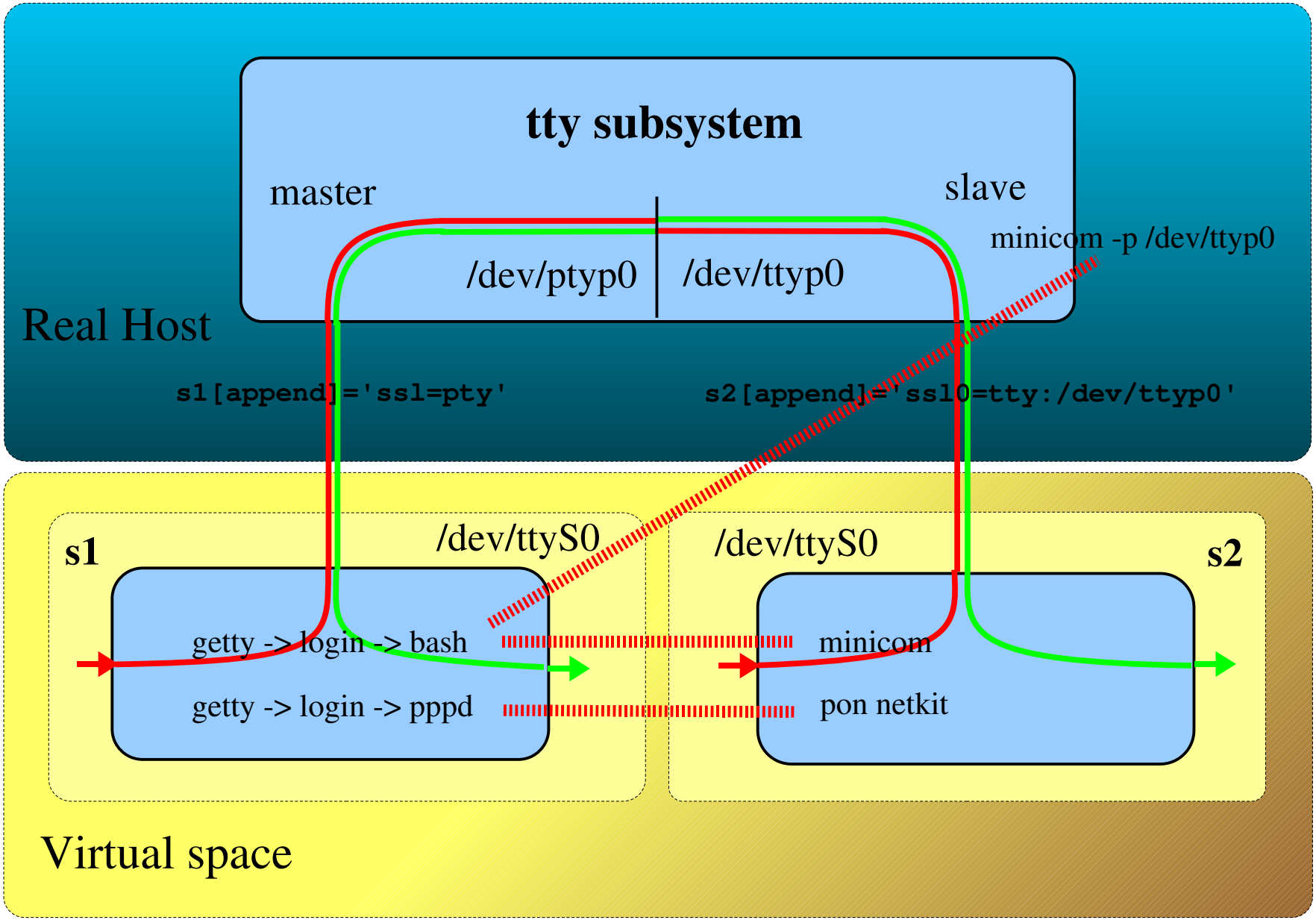
step 1 – serial topology



step 2 – prerequisite

realHost

```
realHost:~# cat /proc/tty/drivers
/dev/tty         /dev/tty         5       0 system:/dev/tty
/dev/console     /dev/console     5       1 system:console
/dev/ptmx        /dev/ptmx        5       2 system
/dev/vc/0        /dev/vc/0        4       0 system:vtmaster
serial           /dev/ttyS        4  64-111 serial
pty_slave        /dev/pts       136 0-1048575 pty:slave
pty_master       /dev/ptm       128 0-1048575 pty:master
pty_slave        /dev/ttyp        3   0-255 pty:slave
pty_master       /dev/pty         2   0-255 pty:master
unknown          /dev/tty         4    1-63 console
```

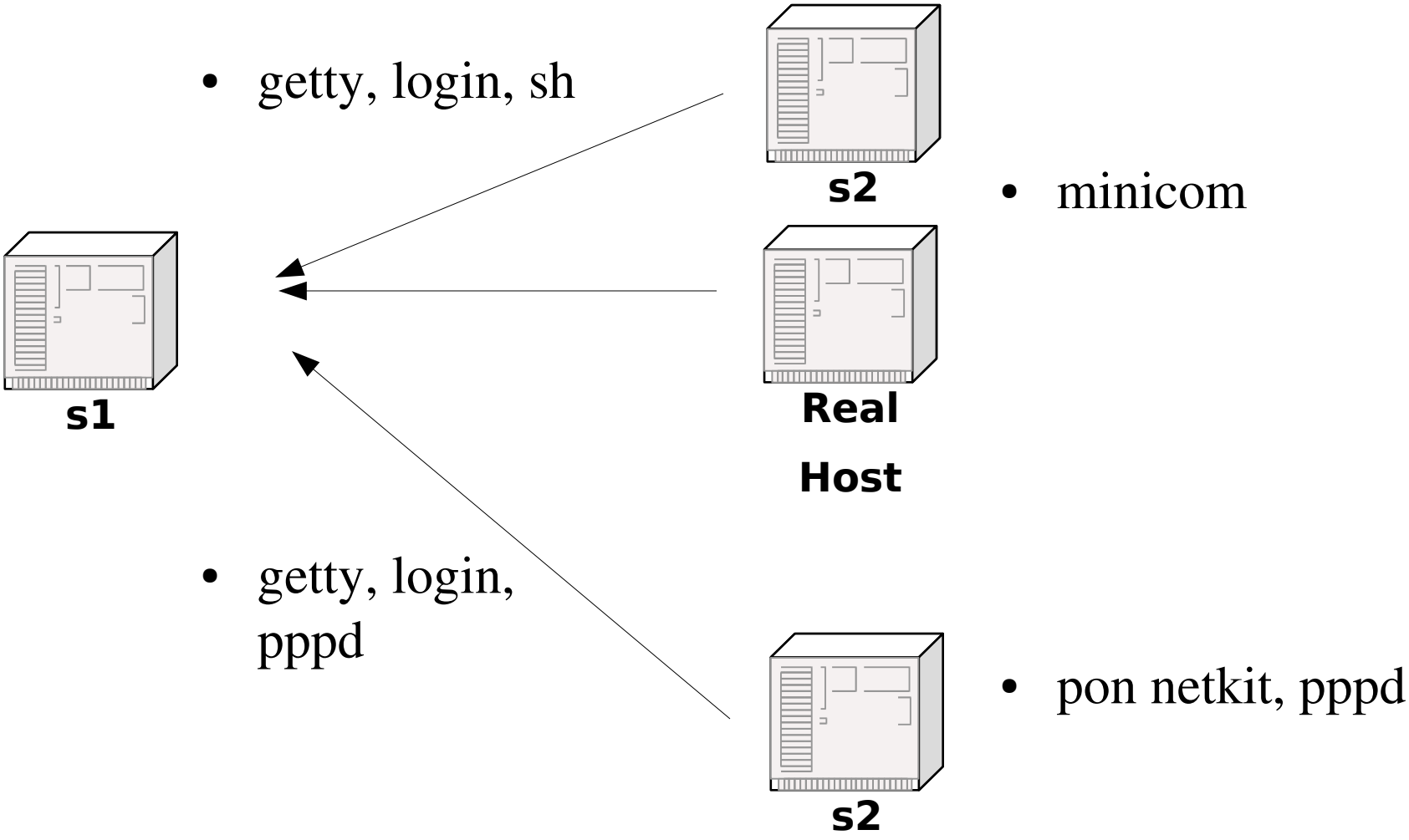
step 3 – starting the lab

host machine

```
user@realHost:~$ cd serial
user@realHost:~/serial$ cp netkit4tic.ds \
                        ~/.devilspie
user@realHost:~/serial$ devilspie &
user@realHost:~/serial$ lstart
```

- upon launching the lab
  - 2 virtual machines are started
  - getty is started on serial /dev/ttyS0 in s1 node
  - node s2 is ready to test serial comunication with s1 on its serial /dev/ttyS0 using minicom or using pppd.
  - also real host is ready to test serial comunication with s1 on its /dev/ttyp0 using minicom

step 4 – involved software



step 5 – configure getty

- make a local serial line and attach to pseudo terminal

```
s1
s1:~# mknod /dev/ttyS0 c 4 64; \
      stty -F /dev/ttyS0 38400; \
      dmesg | grep Serial; \
      dmesg | grep "assigned console"
```

- configure getty to startup on above serial line, enable secure serial line and signals the changes to daemon:

```
s1
s1:~# echo "T0:23:respawn:/sbin/getty” \
           “ -L ttyS0 38400 vt100" >> /etc/inittab; \
      echo "ttyS0" >> /etc/securetty; \
      init Q
```

step 5 – configure minicom

- investigate the configuration of minicom (null modem)

s2

```
s2:~# cat /etc/minicom/minirc.dfl
# /etc/minicom/minirc.dfl
# use "minicom -s" to change parameters.
pu port             /dev/ttyS0
pu baudrate         38400
pu bits             8
pu parity           N
pu stopbits         1
pu scriptprog
pu minit
pu mreset
```

step 5 – test getty/minicom from s2

- configure minicom with system-wide configuration (null-modem): /etc/minicom/minirc.dfl
- start minicom on **s2**.

s2

```
s2:~# minicom

Welcome to minicom 2.1

OPTIONS: History Buffer, F-key Macros, Search History
Compiled on Mar 29 2005, 09:39:09.

Press CTRL-A Z for help on special keys
Debian GNU/Linux 3.1 s1 ttyS0

s1 login:
```

press Ctrl-A Z for help

step 5 – test getty/minicom from realHost

- configure minicom with system-wide configuration (null-modem): /etc/minicom/minirc.dfl
- start minicom on **`real host`**.

realHost

```
realHost# cp minirc.dfl /etc/minicom/minirc.dfl
realHost# minicom -p /dev/ttyp0

Welcome to minicom 2.1

OPTIONS: History Buffer, F-key Macros, Search History
Compiled on Mar 29 2005, 09:39:09.

Press CTRL-A Z for help on special keys
Debian GNU/Linux 3.1 s1 ttyS0

s1 login:
```

press Ctrl-A Z for help

step 6 – verify

- investigate the use of pseudo terminals inside host machine (list pid and device):

realHost

```
realHost:~$ lsof | \
            grep -e "ttyp0\|ptyp0" | \
            awk '{print $2 " " $8}'
3943 /UNIONFS/dev/ptyp0
3953 /UNIONFS/dev/ptyp0
3962 /UNIONFS/dev/ptyp0
4056 /UNIONFS/dev/ttyp0
4064 /UNIONFS/dev/ttyp0
4067 /UNIONFS/dev/ttyp0
```

step 7 – configure getty/pppd

- configure node s1 to act as server:
  - configure syslog to log in dedicated file /var/log/ppp.log
  - configure getty and fire up on /dev/ttyS0
  - create a new user fppp (add group dip)
  - create a logon script for the above user to startup automatically pppd
  - define pppd options
- configure node s2 to act as client:
  - configure initial chat
  - define netkit peer
  - define pppd options

step 8 – configure s1

- configure syslogd to redirect ppp logs into a private file:

```
s1:~# grep ppp /etc/syslog.conf
local2.*                -/var/log/ppp.log
```

- restart system logging utilities:

```
s1:~# /etc/init.d/sysklogd restart
```

step 8 – configure s1

- make a local serial line and attach to pseudo terminal

```
s1
s1:~# mknod /dev/ttyS0 c 4 64; \
      stty -F /dev/ttyS0 38400; \
      dmesg | grep Serial; \
      dmesg | grep "assigned console"
```

- configure getty to startup on above serial line, enable secure serial line and signals the changes to daemon:

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      echo "ttyS0" >> /etc/securetty; \
      init Q
```

step 8 – configure s1

- create a new user fppp

s1

```
s1:~#echo \
      "fppp::504:100:Free PPP:/tmp:/etc/ppp/ppplogin" \
      >> /etc/passwd
```

- add fppp user to dip group (Dialup IP):

s1

```
s1:~# adduser fppp dip
```

step 8 – configure s1

- create a logon script for fppp user:

s1

```
s1:~#cat /etc/ppp/ppplogin
#!/bin/sh
# ppplogin - script to fire up pppd on login
mesg n
stty -echo
exec /usr/sbin/pppd -detach silent 10.0.0.1:10.0.0.2
```

- make it executable:

s1

```
s1:~# chmod a+x /etc/ppp/ppplogin
```

step 9 – configure s2

- make a local serial line and attach to pseudo terminal

s2

```
s1:~# mknod /dev/ttyS0 c 4 64; \
      stty -F /dev/ttyS0 38400; \
      dmesg | grep Serial; \
      dmesg | grep "assigned console"
```

- configure initial chat:

s2

```
s1:~# cat /etc/ppp/ch
-BREAK-ogin:-BREAK-ogin: fppp
```

step 9 – configure s2

- define netkit peer:

s2

```
s1:~# cat /etc/ppp/peers/netkit
connect "chat -v -f /etc/ppp/ch"
/dev/ttyS0
```

- define ppp options:

s2

```
s1:~# cat /etc/ppp/options
38400 lock noauth nobsdcomp nodeflate
```

step 10 – test

- connet s2 to s1 via ppp:

s2

```
s2:~# pon netkit
s2:~# ifconfig ppp0
ppp0      Link encap:Point-to-Point Protocol
          inet addr:10.0.0.2  P-t-P:10.0.0.1  Mask:255.255.255.255
          UP POINTOPOINT RUNNING NOARP MULTICAST  MTU:1500  Metric:1
          RX packets:3 errors:1 dropped:0 overruns:0 frame:0
          TX packets:3 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:3
          RX bytes:42 (42.0 b)  TX bytes:48 (48.0 b)
s2:~# ping -c 1 10.0.0.1
PING 10.0.0.1 (10.0.0.1) 56(84) bytes of data.
64 bytes from 10.0.0.1: icmp_seq=1 ttl=64 time=12.2 ms

--- 10.0.0.1 ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 12.200/12.200/12.200/0.000 ms
```

step 10 – test

- verify from s1 node:

s1

```
s1:~# ifconfig ppp0
ppp0      Link encap:Point-to-Point Protocol
          inet addr:10.0.0.1  P-t-P:10.0.0.2  Mask:255.255.255.255
          UP POINTOPOINT RUNNING NOARP MULTICAST  MTU:1500  Metric:1
          RX packets:4 errors:0 dropped:0 overruns:0 frame:0
          TX packets:4 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:3
          RX bytes:132 (132.0 b)  TX bytes:126 (126.0 b)
s1:~# ping -c 1 10.0.0.2
PING 10.0.0.2 (10.0.0.2) 56(84) bytes of data.
64 bytes from 10.0.0.2: icmp_seq=1 ttl=64 time=12.1 ms

--- 10.0.0.2 ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 12.131/12.131/12.131/0.000 ms
```