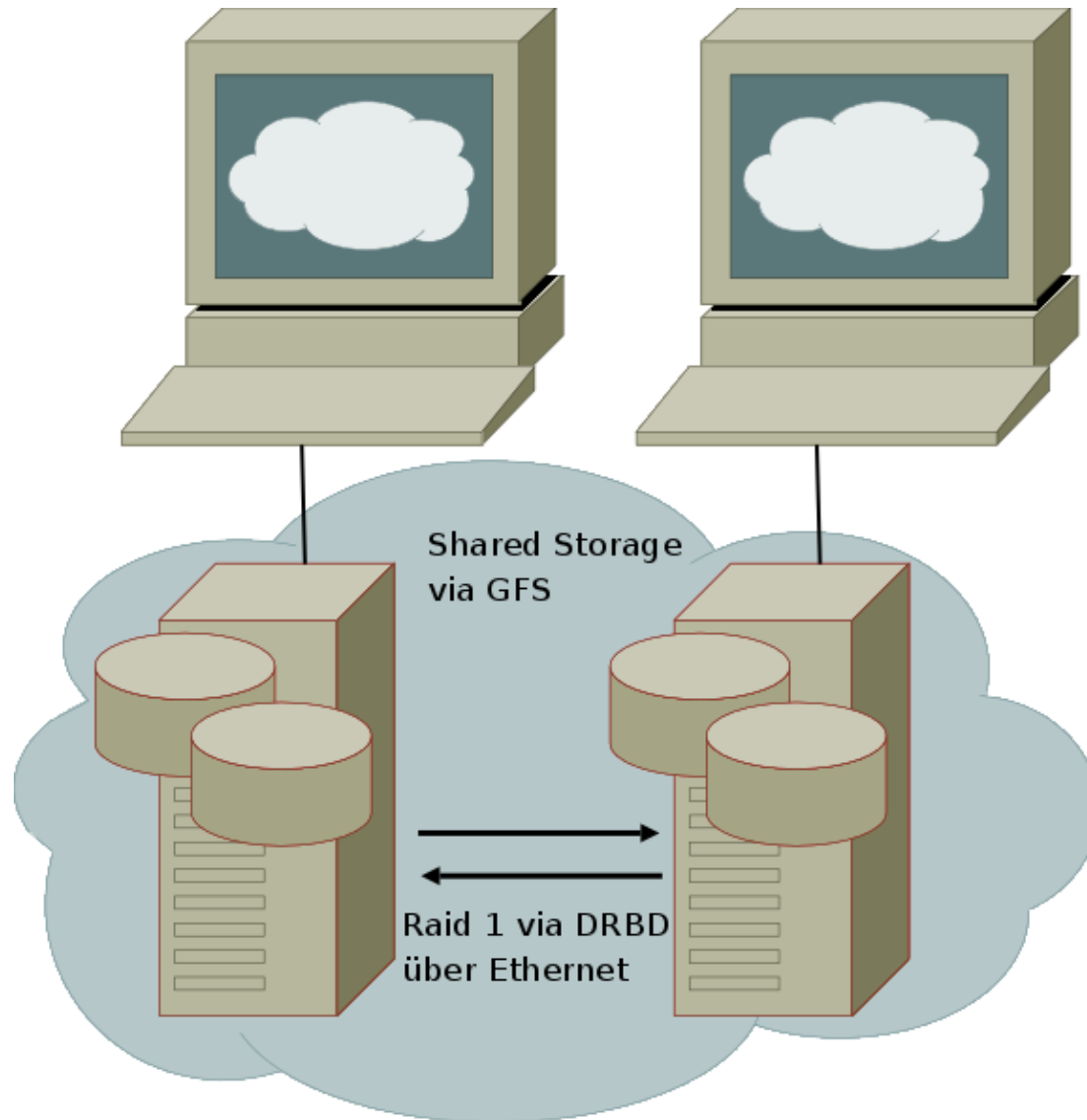


# Shared Storage Cluster

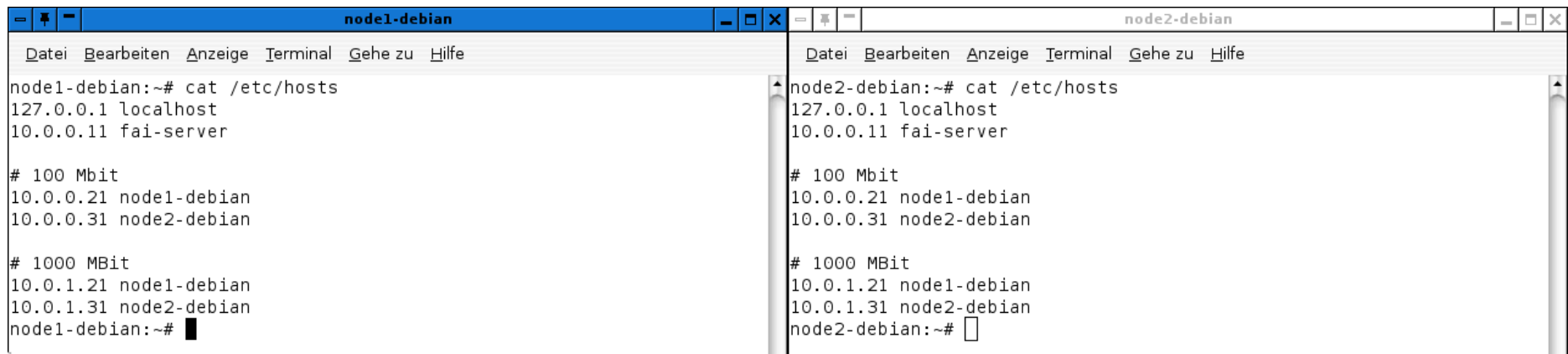
2 Knoten-Cluster  
mit DRBD und GFS

# „Remote-Raid 1“ dank DRBD



# Hardware

- 2 Server
- je 2 Netzwerkinterfaces
- je 1 freie Partition



```
node1-debian
Datei Bearbeiten Anzeige Terminal Gehe zu Hilfe
node1-debian:~# cat /etc/hosts
127.0.0.1 localhost
10.0.0.11 fai-server

# 100 Mbit
10.0.0.21 node1-debian
10.0.0.31 node2-debian

# 1000 MBit
10.0.1.21 node1-debian
10.0.1.31 node2-debian
node1-debian:~# █

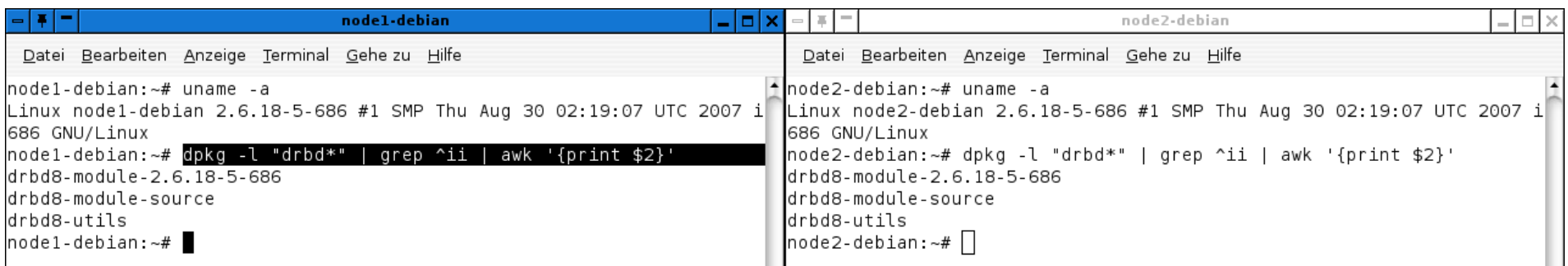
node2-debian
Datei Bearbeiten Anzeige Terminal Gehe zu Hilfe
node2-debian:~# cat /etc/hosts
127.0.0.1 localhost
10.0.0.11 fai-server

# 100 Mbit
10.0.0.21 node1-debian
10.0.0.31 node2-debian

# 1000 MBit
10.0.1.21 node1-debian
10.0.1.31 node2-debian
node2-debian:~# █
```

# Software

- Linux (z.B. Debian/Etch)
- DRBD (>=8.0 aus backports.org)
- Redhat-Cluster (redhat-cluster-modules + Userspace-Programme)

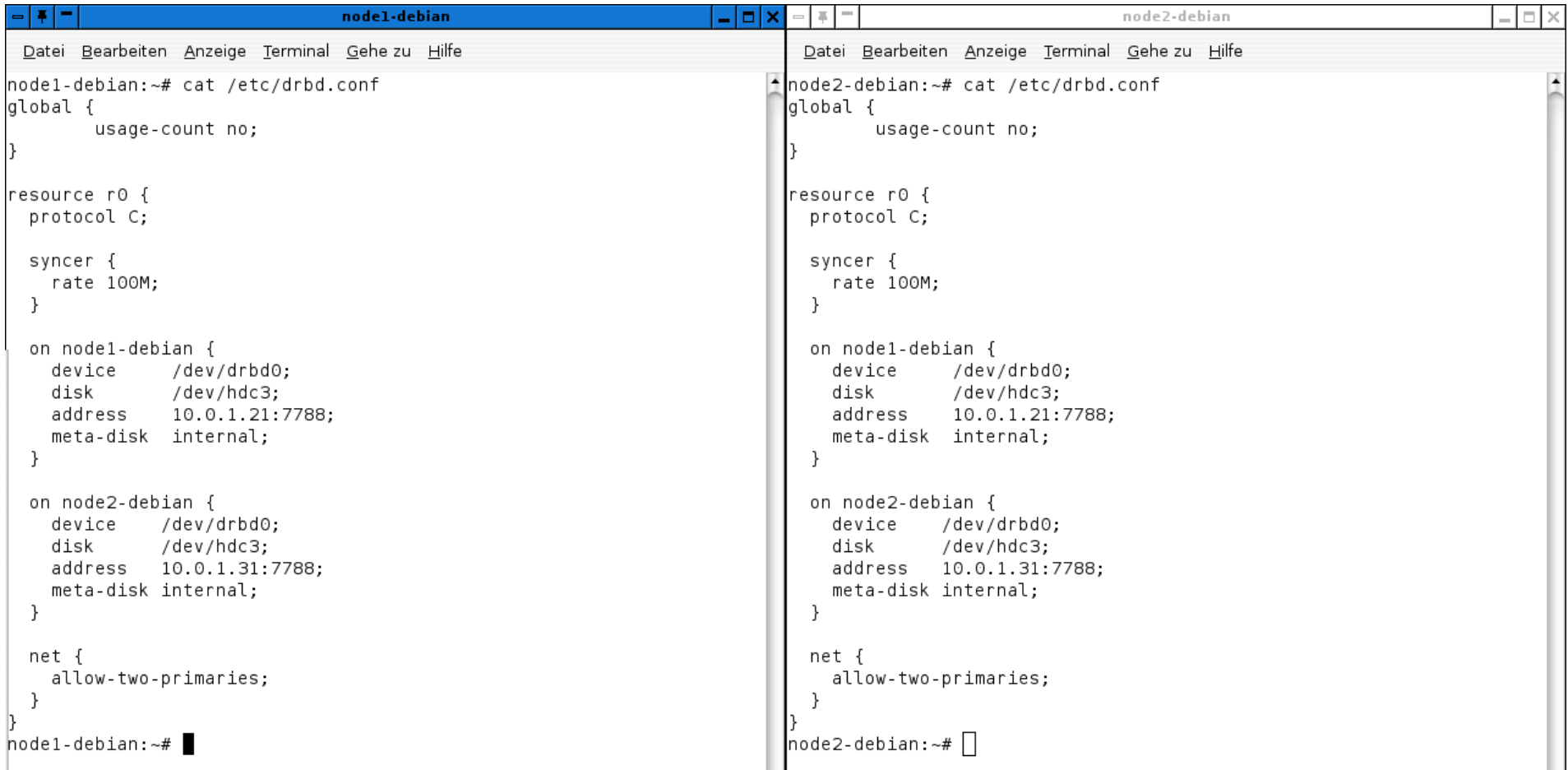


The image shows two terminal windows side-by-side, representing two nodes in a cluster. The left window is titled 'node1-debian' and the right window is titled 'node2-debian'. Both windows show the output of the 'uname -a' command, indicating they are running Linux kernel 2.6.18-5-686. The left window then shows the command 'dpkg -l "drbd\*" | grep ^ii | awk '{print \$2}'' being executed, which lists the installed DRBD packages: 'drbd8-module-2.6.18-5-686', 'drbd8-module-source', and 'drbd8-utils'. The right window shows the same command being executed, resulting in the same list of packages.

```
node1-debian:~# uname -a
Linux node1-debian 2.6.18-5-686 #1 SMP Thu Aug 30 02:19:07 UTC 2007 i
686 GNU/Linux
node1-debian:~# dpkg -l "drbd*" | grep ^ii | awk '{print $2}'
drbd8-module-2.6.18-5-686
drbd8-module-source
drbd8-utils
node1-debian:~# █

node2-debian:~# uname -a
Linux node2-debian 2.6.18-5-686 #1 SMP Thu Aug 30 02:19:07 UTC 2007 i
686 GNU/Linux
node2-debian:~# dpkg -l "drbd*" | grep ^ii | awk '{print $2}'
drbd8-module-2.6.18-5-686
drbd8-module-source
drbd8-utils
node2-debian:~# █
```

# DRBD: simple /etc/drbd.conf



```
node1-debian
Datei Bearbeiten Anzeige Terminal Gehe zu Hilfe
node1-debian:~# cat /etc/drbd.conf
global {
    usage-count no;
}

resource r0 {
    protocol C;

    syncer {
        rate 100M;
    }

    on node1-debian {
        device    /dev/drbd0;
        disk      /dev/hdc3;
        address   10.0.1.21:7788;
        meta-disk internal;
    }

    on node2-debian {
        device    /dev/drbd0;
        disk      /dev/hdc3;
        address   10.0.1.31:7788;
        meta-disk internal;
    }

    net {
        allow-two-primaries;
    }
}
node1-debian:~# █

node2-debian
Datei Bearbeiten Anzeige Terminal Gehe zu Hilfe
node2-debian:~# cat /etc/drbd.conf
global {
    usage-count no;
}

resource r0 {
    protocol C;

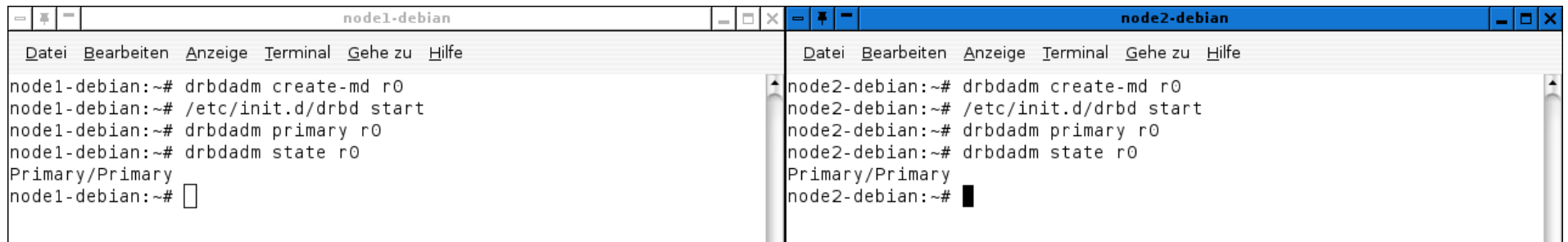
    syncer {
        rate 100M;
    }

    on node1-debian {
        device    /dev/drbd0;
        disk      /dev/hdc3;
        address   10.0.1.21:7788;
        meta-disk internal;
    }

    on node2-debian {
        device    /dev/drbd0;
        disk      /dev/hdc3;
        address   10.0.1.31:7788;
        meta-disk internal;
    }

    net {
        allow-two-primaries;
    }
}
node2-debian:~# █
```

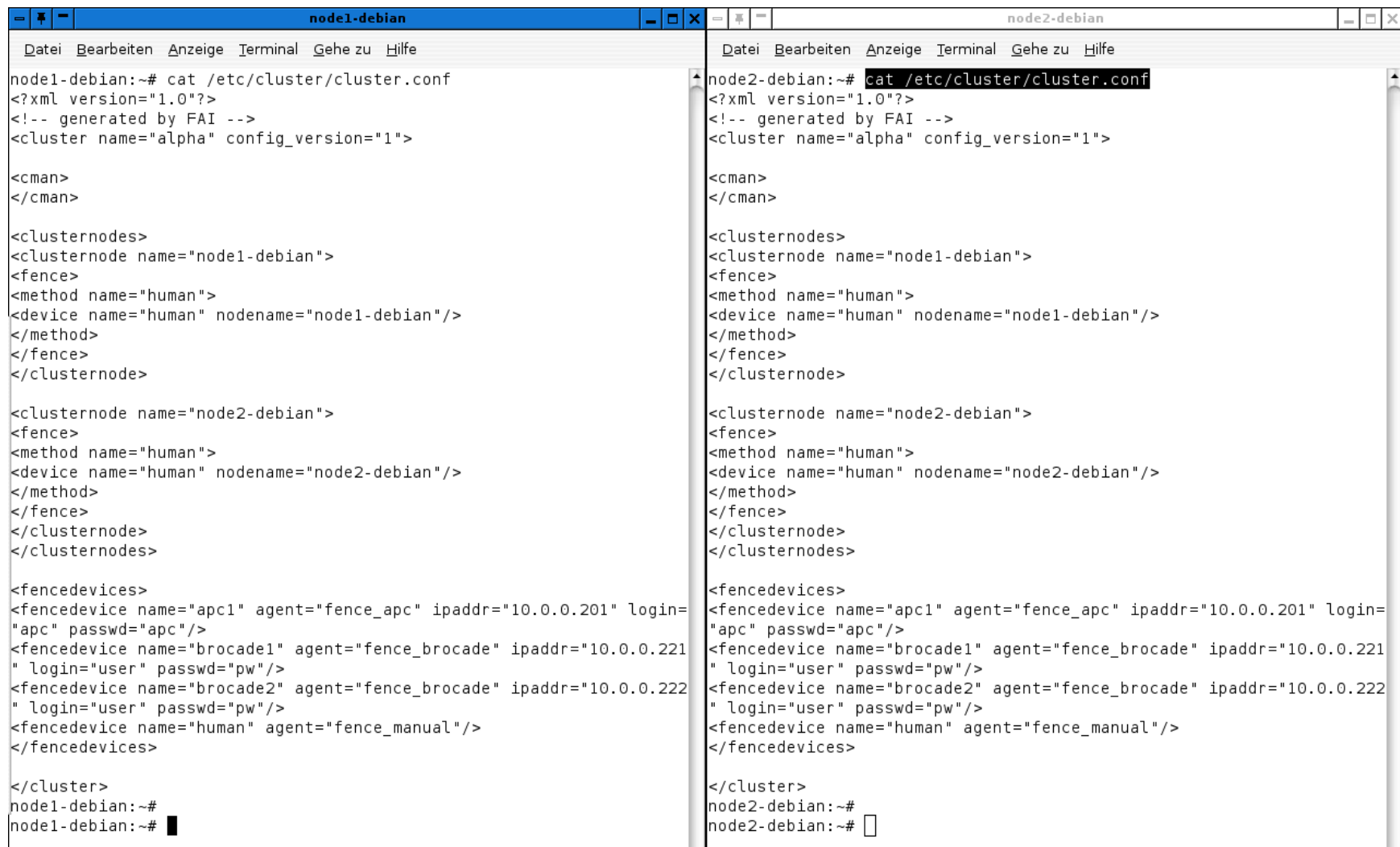
# DRBD starten



```
node1-debian
Datei Bearbeiten Anzeige Terminal Gehe zu Hilfe
node1-debian:~# drbdadm create-md r0
node1-debian:~# /etc/init.d/drbd start
node1-debian:~# drbdadm primary r0
node1-debian:~# drbdadm state r0
Primary/Primary
node1-debian:~# █

node2-debian
Datei Bearbeiten Anzeige Terminal Gehe zu Hilfe
node2-debian:~# drbdadm create-md r0
node2-debian:~# /etc/init.d/drbd start
node2-debian:~# drbdadm primary r0
node2-debian:~# drbdadm state r0
Primary/Primary
node2-debian:~# █
```

# Redhat Cluster/GFS: cluster.conf



```
node1-debian:~# cat /etc/cluster/cluster.conf
<?xml version="1.0"?>
<!-- generated by FAI -->
<cluster name="alpha" config_version="1">

<cman>
</cman>

<clusternodes>
<clusternode name="node1-debian">
<fence>
<method name="human">
<device name="human" nodename="node1-debian"/>
</method>
</fence>
</clusternode>

<clusternode name="node2-debian">
<fence>
<method name="human">
<device name="human" nodename="node2-debian"/>
</method>
</fence>
</clusternode>
</clusternodes>

<fencedevices>
<fencedevice name="apc1" agent="fence_apc" ipaddr="10.0.0.201" login=
"apc" passwd="apc"/>
<fencedevice name="brocade1" agent="fence_brocade" ipaddr="10.0.0.221
" login="user" passwd="pw"/>
<fencedevice name="brocade2" agent="fence_brocade" ipaddr="10.0.0.222
" login="user" passwd="pw"/>
<fencedevice name="human" agent="fence_manual"/>
</fencedevices>

</cluster>
node1-debian:~#
node1-debian:~# █

node2-debian:~# cat /etc/cluster/cluster.conf
<?xml version="1.0"?>
<!-- generated by FAI -->
<cluster name="alpha" config_version="1">

<cman>
</cman>

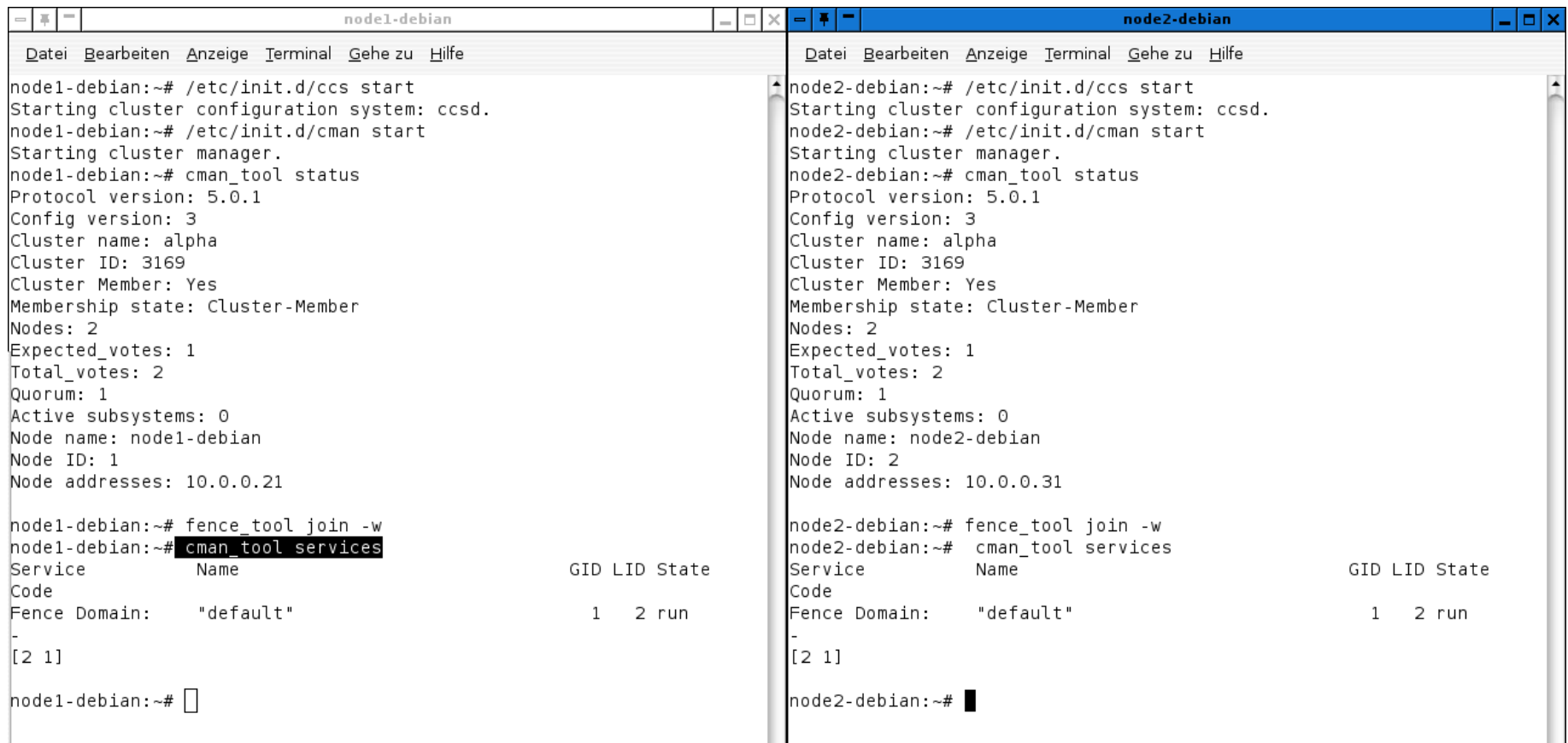
<clusternodes>
<clusternode name="node1-debian">
<fence>
<method name="human">
<device name="human" nodename="node1-debian"/>
</method>
</fence>
</clusternode>

<clusternode name="node2-debian">
<fence>
<method name="human">
<device name="human" nodename="node2-debian"/>
</method>
</fence>
</clusternode>
</clusternodes>

<fencedevices>
<fencedevice name="apc1" agent="fence_apc" ipaddr="10.0.0.201" login=
"apc" passwd="apc"/>
<fencedevice name="brocade1" agent="fence_brocade" ipaddr="10.0.0.221
" login="user" passwd="pw"/>
<fencedevice name="brocade2" agent="fence_brocade" ipaddr="10.0.0.222
" login="user" passwd="pw"/>
<fencedevice name="human" agent="fence_manual"/>
</fencedevices>

</cluster>
node2-debian:~#
node2-debian:~# █
```

# Redhat Cluster starten



The image shows two terminal windows side-by-side, representing two nodes in a Redhat Cluster. The left window is titled 'node1-debian' and the right window is titled 'node2-debian'. Both windows show the same sequence of commands and outputs:

```
node1-debian:~# /etc/init.d/ccs start
Starting cluster configuration system: ccsd.
node1-debian:~# /etc/init.d/cman start
Starting cluster manager.
node1-debian:~# cman_tool status
Protocol version: 5.0.1
Config version: 3
Cluster name: alpha
Cluster ID: 3169
Cluster Member: Yes
Membership state: Cluster-Member
Nodes: 2
Expected_votes: 1
Total_votes: 2
Quorum: 1
Active subsystems: 0
Node name: node1-debian
Node ID: 1
Node addresses: 10.0.0.21

node1-debian:~# fence_tool join -w
node1-debian:~# cman_tool services
Service      Name      GID LID State
Code
Fence Domain: "default"      1  2 run
-
[2 1]

node1-debian:~#
```

The right window shows identical output, but with the Node ID set to 2 and the Node address set to 10.0.0.31.



# GFS: Dateisystem erstellen

```
node1-debian
Datei Bearbeiten Anzeige Terminal Gehe zu Hilfe
node1-debian:~# cat /proc/drbd
version: 8.0.4 (api:86/proto:86)
SVN Revision: 2947 build by root@node2-debian, 2007-09-07 01:14:01
0: cs:Connected st:Primary/Primary ds:UpToDate/UpToDate C r---
   ns:0 nr:19034956 dw:19034956 dr:0 al:0 bm:1162 lo:0 pe:0 ua:0 ap:
0
   resync: used:0/31 hits:1188524 misses:1162 starving:0 dirty:0
changed:1162
   act_log: used:0/127 hits:0 misses:0 starving:0 dirty:0 change
d:0
node1-debian:~#
node1-debian:~# cat /proc/drbd
version: 8.0.4 (api:86/proto:86)
SVN Revision: 2947 build by root@node2-debian, 2007-09-07 01:14:01
0: cs:Connected st:Primary/Primary ds:UpToDate/UpToDate C r---
   ns:0 nr:19068956 dw:19068956 dr:0 al:0 bm:1162 lo:0 pe:0 ua:0 ap:
0
   resync: used:0/31 hits:1188524 misses:1162 starving:0 dirty:0
changed:1162
   act_log: used:0/127 hits:0 misses:0 starving:0 dirty:0 change
d:0
node1-debian:~# mount -t gfs -o noatime,nodiratime /dev/drbd0 /mnt
node1-debian:~#
node1-debian:~# mount
/dev/hdc1 on / type ext3 (rw,errors=remount-ro)
tmpfs on /lib/init/rw type tmpfs (rw,nosuid,mode=0755)
proc on /proc type proc (rw,noexec,nosuid,nodev)
sysfs on /sys type sysfs (rw,noexec,nosuid,nodev)
procbususb on /proc/bus/usb type usbfs (rw)
udev on /dev type tmpfs (rw,mode=0755)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev)
devpts on /dev/pts type devpts (rw,noexec,nosuid,gid=5,mode=620)
/dev/drbd0 on /mnt type gfs (rw,noatime,nodiratime)
node1-debian:~# █

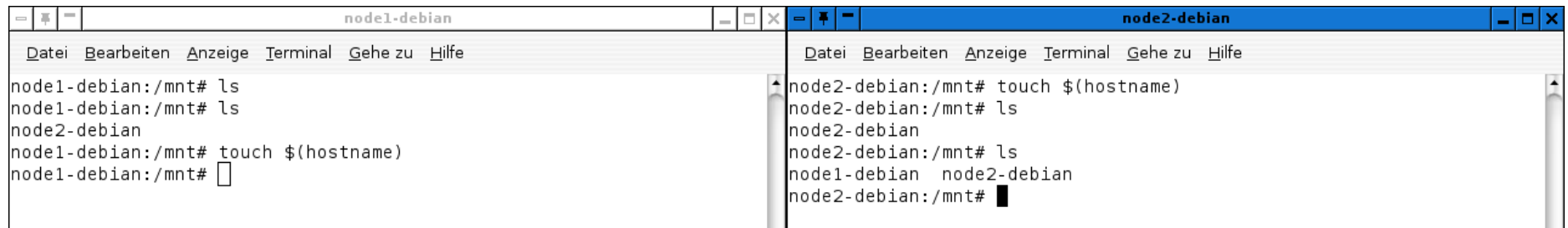
node2-debian
Datei Bearbeiten Anzeige Terminal Gehe zu Hilfe
node2-debian:~# gfs_mkfs -p lock_dlm -t alpha:drbd -j 4 /dev/drbd0
This will destroy any data on /dev/drbd0.
It appears to contain a swap device.

Are you sure you want to proceed? [y/n] y

Device:                /dev/drbd0
Blocksize:             4096
Filesystem Size:      4627324
Journals:              4
Resource Groups:      72
Locking Protocol:     lock_dlm
Lock Table:           alpha:drbd

Syncing...
All Done
node2-debian:~# mount -t gfs -o noatime,nodiratime /dev/drbd0 /mnt
node2-debian:~#
node2-debian:~# mount
/dev/hdc1 on / type ext3 (rw,errors=remount-ro)
tmpfs on /lib/init/rw type tmpfs (rw,nosuid,mode=0755)
proc on /proc type proc (rw,noexec,nosuid,nodev)
sysfs on /sys type sysfs (rw,noexec,nosuid,nodev)
procbususb on /proc/bus/usb type usbfs (rw)
udev on /dev type tmpfs (rw,mode=0755)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev)
devpts on /dev/pts type devpts (rw,noexec,nosuid,gid=5,mode=620)
/dev/drbd0 on /mnt type gfs (rw,noatime,nodiratime)
node2-debian:~# █
```

# Clusterdateisystem benutzen



```
node1-debian:~/mnt# ls
node1-debian:~/mnt# ls
node2-debian
node1-debian:~/mnt# touch $(hostname)
node1-debian:~/mnt# █

node2-debian:~/mnt# touch $(hostname)
node2-debian:~/mnt# ls
node2-debian
node2-debian:~/mnt# ls
node1-debian node2-debian
node2-debian:~/mnt# █
```

# Links

- Debian: <http://www.debian.org/>
- Redhat-Cluster:  
<http://sources.redhat.com/cluster/>
- DRBD: <http://www.drbd.org/>

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