

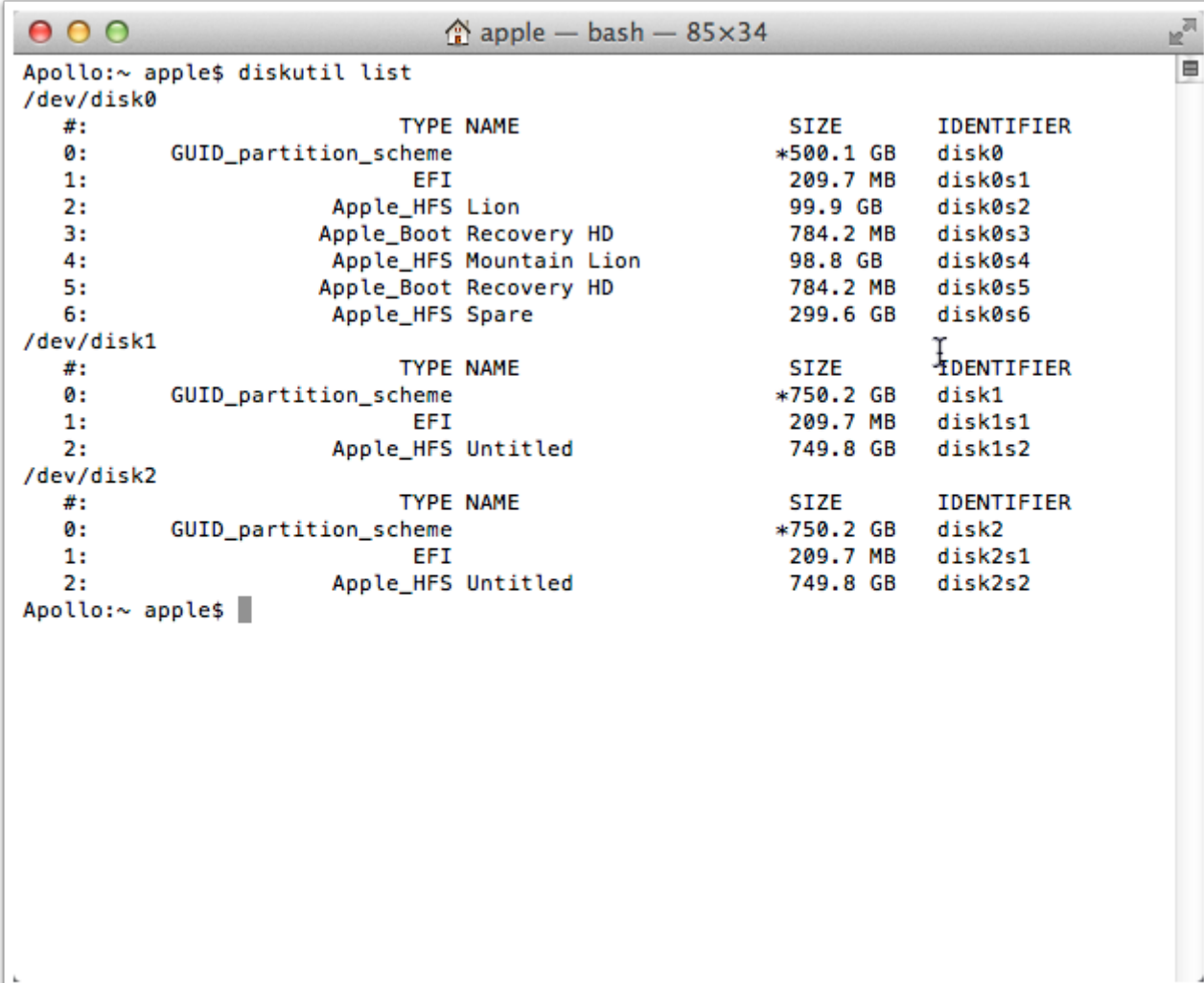
The right way to create a Fusion volume with a Recovery HD

Disclaimer

These instructions are not intended to document all of the intricacies and caveats of creating an Apple Fusion volume. Rather, these instructions simply aim to demonstrate how to retain a Recovery HD volume while creating a Fusion volume. Creating a Fusion volume involves deleting all of the information from the member volumes. If you are not familiar with the Terminal application or with disk partitioning, please use extreme caution. We also recommend that you have a complete backup of any irreplaceable data before proceeding. Conveniently, CCC can do that for you too!

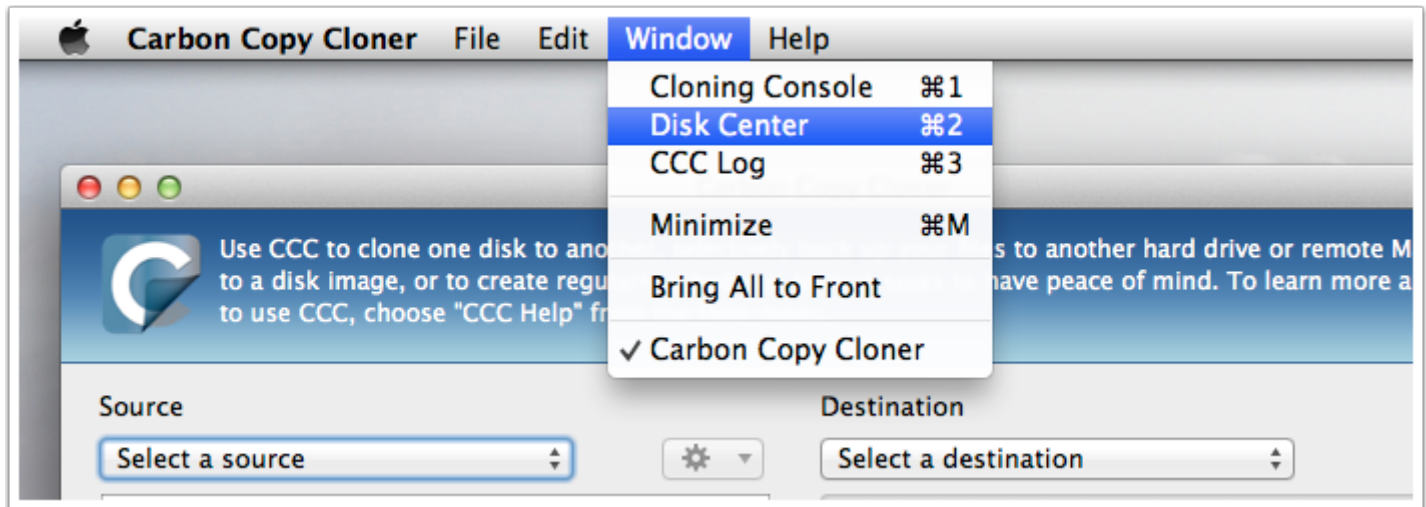
Start with a pair of empty, freshly partitioned disks

In this case, disk0 is the startup disk, which will remain unaffected. disk1 and disk2 are both external hard drive enclosures, partitioned with the GPT partitioning scheme and containing one freshly formatted, Journaled HFS+ volume. **Warning: We do not recommend that you create a Fusion volume with external hard drive enclosures, this is just for demonstration purposes.**



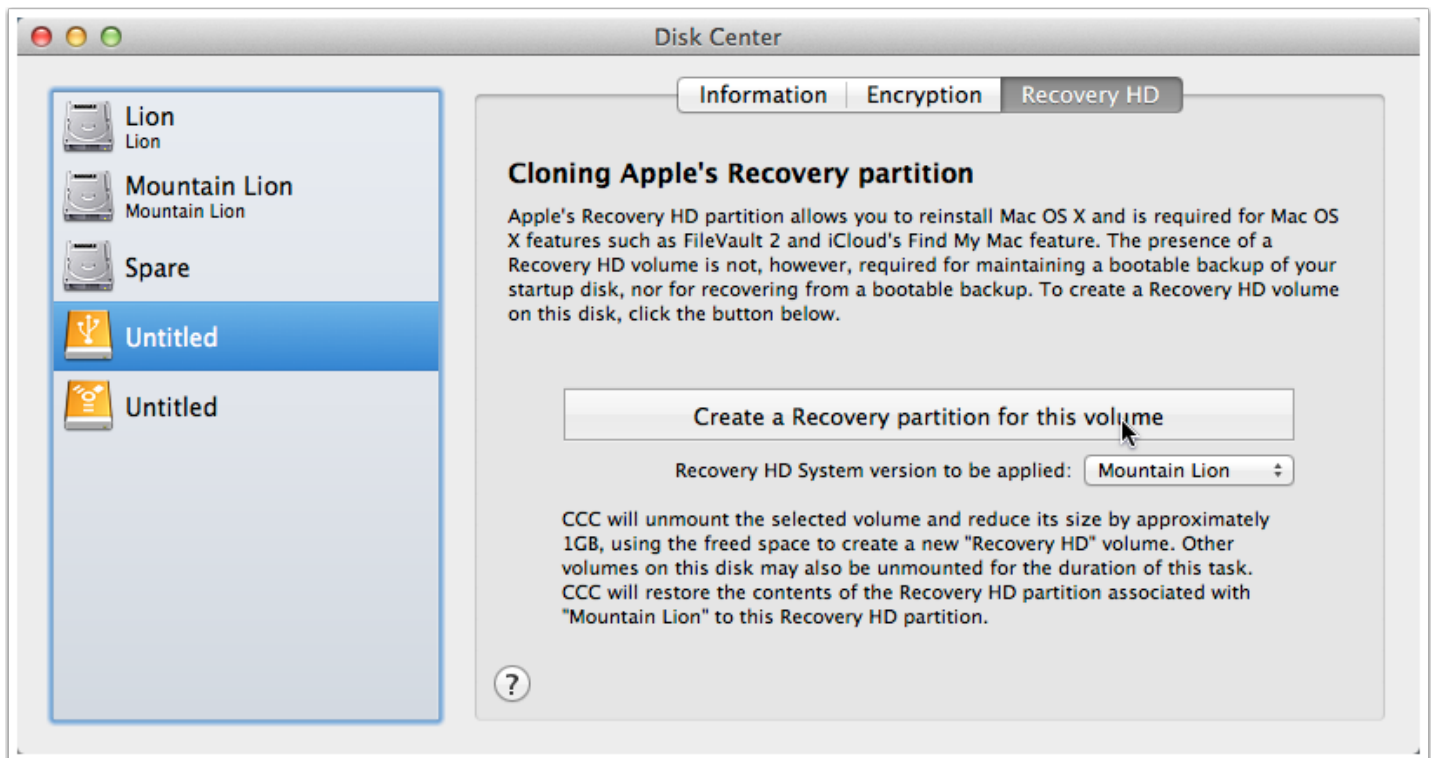
```
Apollo:~ apple$ diskutil list
/dev/disk0
#:                                TYPE NAME                      SIZE          IDENTIFIER
0:                                GUID_partition_scheme         *500.1 GB     disk0
1:                                EFI                           209.7 MB     disk0s1
2:                                Apple_HFS Lion                 99.9 GB      disk0s2
3:                                Apple_Boot Recovery HD        784.2 MB     disk0s3
4:                                Apple_HFS Mountain Lion       98.8 GB      disk0s4
5:                                Apple_Boot Recovery HD        784.2 MB     disk0s5
6:                                Apple_HFS Spare               299.6 GB     disk0s6
/dev/disk1
#:                                TYPE NAME                      SIZE          IDENTIFIER
0:                                GUID_partition_scheme         *750.2 GB     disk1
1:                                EFI                           209.7 MB     disk1s1
2:                                Apple_HFS Untitled            749.8 GB     disk1s2
/dev/disk2
#:                                TYPE NAME                      SIZE          IDENTIFIER
0:                                GUID_partition_scheme         *750.2 GB     disk2
1:                                EFI                           209.7 MB     disk2s1
2:                                Apple_HFS Untitled            749.8 GB     disk2s2
Apollo:~ apple$
```

Open Carbon Copy Cloner's Disk Center

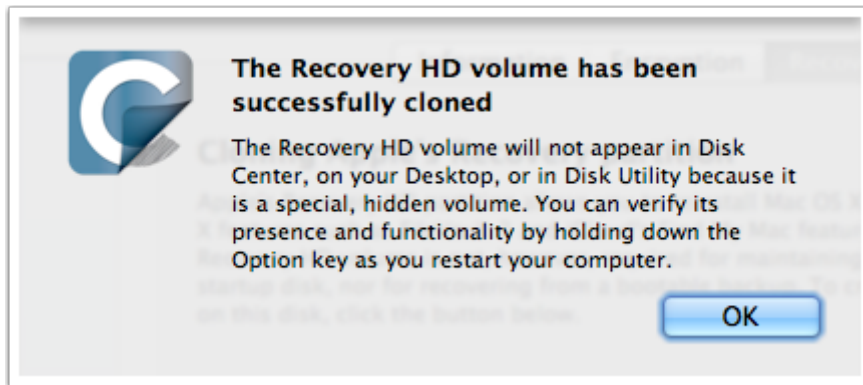


Use CCC's Disk Center to create a Recovery HD

You can use CCC to create a Recovery HD on either or both of the volumes that you intend to add to a Fusion volume. One is typically sufficient, and we recommend that you choose the slower of the two devices. **Warning: Again, we do not recommend that you create a Fusion volume with external hard drive enclosures, this is just for demonstration purposes.**



Recovery HD: Mission accomplished



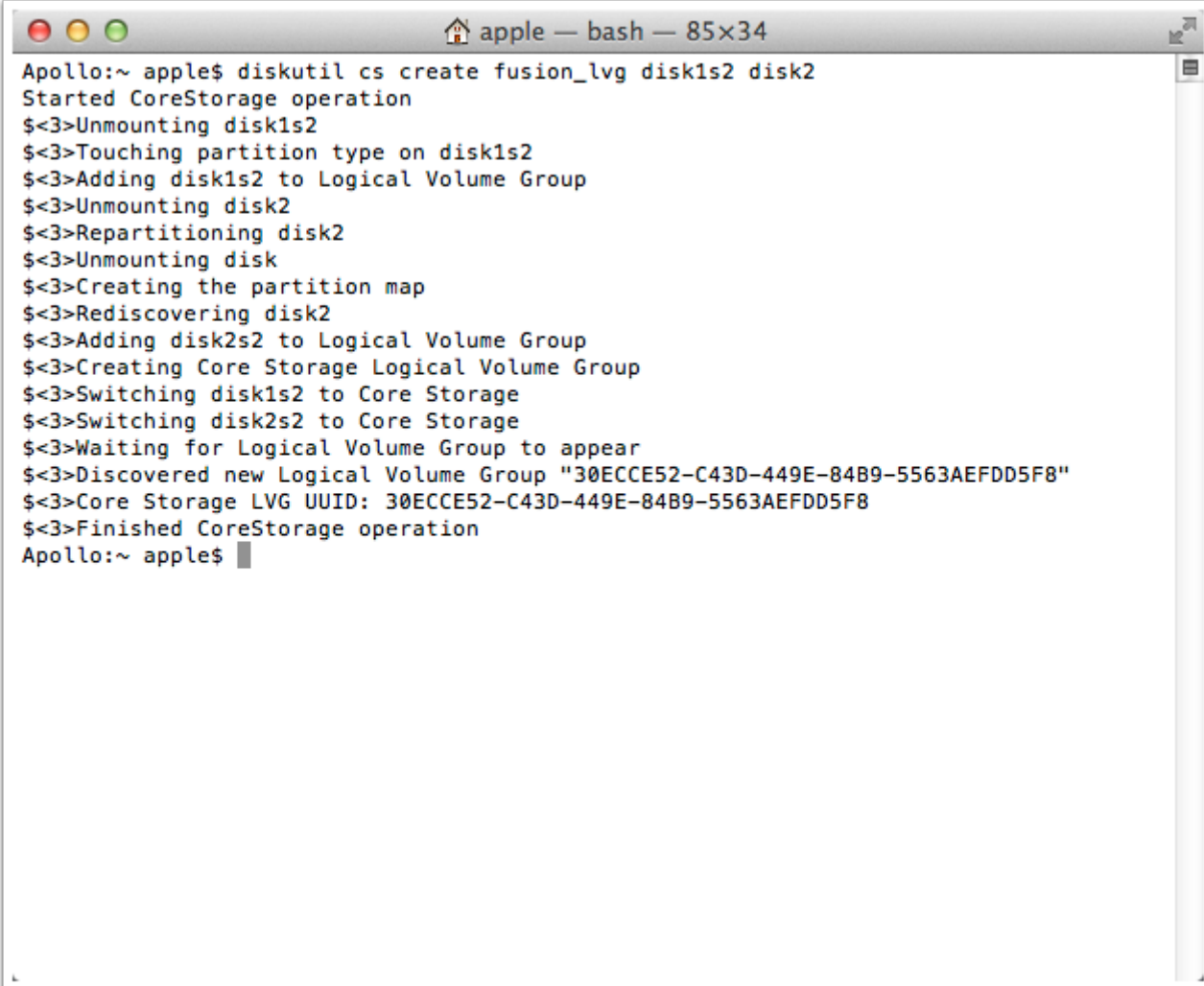
Get a list of devices

You can see that CCC created the Recovery HD immediately adjacent to the donor volume, borrowing space from that volume.

```
apple — bash — 85x34
Apollo:~ apple$ diskutil list
/dev/disk0
#:          TYPE NAME          SIZE      IDENTIFIER
0:    GUID_partition_scheme     *500.1 GB   disk0
1:             EFI                209.7 MB   disk0s1
2:      Apple_HFS Lion             99.9 GB    disk0s2
3:      Apple_Boot Recovery HD     784.2 MB   disk0s3
4:      Apple_HFS Mountain Lion    98.8 GB    disk0s4
5:      Apple_Boot Recovery HD     784.2 MB   disk0s5
6:      Apple_HFS Spare            299.6 GB   disk0s6
/dev/disk1
#:          TYPE NAME          SIZE      IDENTIFIER
0:    GUID_partition_scheme     *750.2 GB   disk1
1:             EFI                209.7 MB   disk1s1
2:      Apple_HFS Untitled         749.2 GB   disk1s2
3:      Apple_Boot Recovery HD     784.2 MB   disk1s3
/dev/disk2
#:          TYPE NAME          SIZE      IDENTIFIER
0:    GUID_partition_scheme     *750.2 GB   disk2
1:             EFI                209.7 MB   disk2s1
2:      Apple_HFS Untitled         749.8 GB   disk2s2
Apollo:~ apple$
```

Create the Fusion Logical Volume Group

When you create the Core Storage LVG, it is *imperative* that you specify only the HFS+ slice from the disk that has the Recovery HD. The slice corresponding to that "Untitled" volume is "disk1s2", whereas the whole disk is "disk1". Either object can be added to the Core Storage LVG, but if you specify the whole disk1 device, the Recovery HD (at disk1s3) will be destroyed. disk2, on the other hand, doesn't have any special volumes to retain, so we go ahead and add that whole device to the LVG.



```
Apple:~ apple$ diskutil cs create fusion_lvg disk1s2 disk2
Started CoreStorage operation
$<3>Unmounting disk1s2
$<3>Touching partition type on disk1s2
$<3>Adding disk1s2 to Logical Volume Group
$<3>Unmounting disk2
$<3>Repartitioning disk2
$<3>Unmounting disk
$<3>Creating the partition map
$<3>Rediscovering disk2
$<3>Adding disk2s2 to Logical Volume Group
$<3>Creating Core Storage Logical Volume Group
$<3>Switching disk1s2 to Core Storage
$<3>Switching disk2s2 to Core Storage
$<3>Waiting for Logical Volume Group to appear
$<3>Discovered new Logical Volume Group "30ECCE52-C43D-449E-84B9-5563AEFDD5F8"
$<3>Core Storage LVG UUID: 30ECCE52-C43D-449E-84B9-5563AEFDD5F8
$<3>Finished CoreStorage operation
Apollo:~ apple$
```

Create a new volume on the Fusion LVG

When it's done, you have a new volume that combines the capacity of both underlying disks while retaining the Recovery HD partition.

```
Apollo:~ apple$ diskutil cs createVolume 30ECCE52-C43D-449E-84B9-5563AEFDD5F8 JHFS+ Fusion 100%
Started CoreStorage operation
$<3>Waiting for Logical Volume to appear
$<3>Formatting file system for Logical Volume
$<3>Initialized /dev/rdisk3 as a 1 TB HFS Plus volume with a 114688k journal
$<3>Mounting disk
$<3>Core Storage LV UUID: D0A11709-7456-4E5F-B7E8-5E82B0D59CF4
$<3>Core Storage disk: disk3
$<3>Finished CoreStorage operation
Apollo:~ apple$ diskutil list
/dev/disk0
#:                TYPE NAME                SIZE      IDENTIFIER
0:    GUID_partition_scheme      *500.1 GB  disk0
1:                EFI                209.7 MB  disk0s1
2:                Apple_HFS Lion        99.9 GB   disk0s2
3:                Apple_Boot Recovery HD  784.2 MB  disk0s3
4:                Apple_HFS Mountain Lion 98.8 GB   disk0s4
5:                Apple_Boot Recovery HD  784.2 MB  disk0s5
6:                Apple_HFS Spare        299.6 GB  disk0s6
/dev/disk1
#:                TYPE NAME                SIZE      IDENTIFIER
0:    GUID_partition_scheme      *750.2 GB  disk1
1:                EFI                209.7 MB  disk1s1
2:                Apple_CoreStorage Untitled  749.2 GB  disk1s2
3:                Apple_Boot Recovery HD  784.2 MB  disk1s3
/dev/disk2
#:                TYPE NAME                SIZE      IDENTIFIER
0:    GUID_partition_scheme      *750.2 GB  disk2
1:                EFI                209.7 MB  disk2s1
2:                Apple_CoreStorage      749.8 GB  disk2s2
3:                Apple_Boot Boot OS X    134.2 MB  disk2s3
/dev/disk3
#:                TYPE NAME                SIZE      IDENTIFIER
0:                Apple_HFS Fusion        *1.5 TB   disk3
Apollo:~ apple$
```