electric monk

Ferry Boender

Programmer, DevOpper, Open Source enthusiast.

Blog

Multiple VirtualBox VMs using one base image (copy-on-write)

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As a developer and systems administrator, I use VirtualBox a lot for building binaries, testing upgrades, etc. It always struck me as a waste that I'd have to clone an entire HD image whenever I needed a fresh install of a machine. Why couldn't I just use a single base image for each Virtual Machine, and have VirtualBox perform copy-on-write whenever it made changes? That way, only the changes to the base image would have to be stored separately for each clone, saving lots of disk space. Turns out it is possible to do just that! I had some problems with the steps in that article though, so here's how I did it.

First, I created a new Virtual Machine and installed it like I always do. Once the VM was all set up, I shut it down, and cloned its harddisk:

```
$ VBoxManage clonehd ~/VirtualBox\ VMs/minimal.deb.local/minimal.deb.local.vdi ~/ba
```

Next, I created a new Virtual Machine:

```
UUID: 1becc453-f4a9-44a8-a6c8-e43b80baf04d
Settings file: '/home/fboender/VirtualBox VMs/clone1/clone1.vbox'
$ VBoxManage modifyvm "clone1" --nic1 hostonly --hostonlyadapter1 "vboxnet0"
$ VBoxManage storagectl "clone1" --name "sata1" --add sata
$ VBoxManage storageattach "clone1" --storagectl "sata1" --port 0 --device 0 --type h
```

The trick here lies in the `--mtype multiattach` option to the `storageattach` command. It tells VirtualBox that I'm going to attach this harddisk image to multiple different Virtual Machines. VirtualBox will then automatically do Copy-on-Write of all changes to a snapshot instead of to the base image. If I simply set the `base.vdi` harddisk image to immutable, as instructed by the article on Xaprb, I cannot attach it to multiple VirtualMachines. Using the `--mtype multiattach` also instructs VirtualBox to make persistant Copy-on-Writes. This means that, unlike the Xaprb article, your snapshot is not reset when starting the VirtualMachine. Thus you will not have to change the snapshots to `autoreset=false`.

You can start the VM now:

```
$ VBoxManage startvm "clone1"
```

If you want to create another VirtualMachine using the same base image, you can repeat the steps above, and replace every occurance of "`clone1`" with "`clone2`" or some other name. Then, when you attach the storage, **you must not refer to the actual VDI file as it exists on disk**, but you must simply refer to its name. So instead of specifying "`--medium ~/base.vdi`", simply enter: "`--medium base.vdi`". The full command thus becomes:

```
$ VBoxManage storageattach "clone2" --storagectl "sata1" --port 0 --device 0 --type
```

We cannot refer directly to the image on disk, because it is already registered with VirtualBox. If you try to do this anyway, you will get an error such as:

```
VBoxManage: error: Cannot register the hard disk '/home/fboender/./base.vdi' {d3c86
VBoxManage: error: Details: code NS_ERROR_INVALID_ARG (0x80070057), component Virtu
Context: "OpenMedium(Bstr(pszFilenameOrUuid).raw(), enmDevType, AccessMode_ReadWrit
VBoxManage: error: Invalid UUID or filename "./base.vdi"
```

If you create new VMs through the GUI, and attach the existing "`base.vdi`" harddisk during the Wizard, it will automatically attach that image in multiattach mode.

Like I said, all changes to the Virtual Machines are not written to the base.vdi image, but to a snapshot instead. The snapshots are very minimal in size:

```
$ ls -lh VirtualBox\ VMs/clone1/Snapshots/
total 26M
```

Only 26 Mb for a full-blown Debian install. Not bad.

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