

Porting NetBSD as Virtual Machine

The Objective is to port NetBSD as a Virtual Machine into Cloud.

Steps Involved in Porting NetBSD as a Virtual Machine:

Porting of NetBSD as a Virtual Machine involves 2 steps.

A. Porting NetBSD w.r.t Virtualization

B. Porting NetBSD w.r.t Cloud MiddleWare

If Step 1 is completed successfully, then only Step2 could be proceeded.

A. Porting NetBSD w.r.t Virtualization:

We use Xen Virtualization. Xen Virtualization involves the following steps. Various methods are available to port NetBSD as Virtual Machine in Xen.

1. Building from ISO (Via Paravirtualization - Using NetBSD community provided Kernel / Full Virtualization - using Qemu)
2. Building the NetBSD File System from the Source

We have tried both the ways.

1.1 Building from ISO (Via Paravirtualization - Using NetBSD community provided Kernel):

1. Get the ISO file of NetBSD Operating System .
2. Build the IMG File from the ISO File by using NetBSD community provided Kernel

Refer : <http://www.netbsd.org/ports/xen/howto.html>

1.2 Building from ISO (Via Full virtualization - Using Qemu):

Refer: <http://open.eucalyptus.com/wiki/creating-images-iso-xen>

By following the above Step, the following version of NetBSD Image was built.

Version	NetBSD 5.1
Kernel	XEN3_DOMU
Kernel Version	NetBSD netbsd51.yourdomain.org 5.1 NetBSD 5.1 (XEN3_DOMU) #0: Sat Nov 6 13:17:16 UTC 2010 builds@b6.netbsd.org:/home/builds/a b/netbsd- 5- 1-

Porting NetBSD as Virtual Machine

	RELEASE/amd64/201011061943Z-obj/home/builds/ab/netbsd- 5- 1-RELEASE/src/sys/arch/amd64/compile/XEN3_DOMU amd64
Architecture	amd64 / 64 Bit Guest Virtual Machine

Working Components :

1. The NetBSD Guest is booted successfully in Multi User Mode, which enables root user to create / delete files / directories.
2. The Network Interface is **xennet0**
3. The File System details are as follows.

Filesystem	Size	Used	Avail	%Cap	Mounted on
/dev/xbd0a	9.5 GB	628 MB	8.4 GB	6%	/
kernfs	1.0K	1.0K	0B	100%	/kern
ptyfs	1.0K	1.0K	0B	100%	/dev/pts
procfs	4.0K	4.0K	0B	100%	/proc

Issues Faced:

1. Unable to set IP Address manually (or) via **dhclient** command.
2. Even though static IP Address is assigned, netmask,gateway is set, the NetBSD Guest Virtual Machine is unable to connect to outside Network; Machines in outside network are also unable to connect to the NetBSD Guest Virtual Machine .

2. Building the NetBSD File System and Kernel from the Source:

NetBSD Image could be built by connecting to the NetBSD repository, download the Source packages, compile and build the Kernel and the NetBSD File

Porting NetBSD as Virtual Machine

System; at last convert the NetBSD File System into a single Image via **makeefs** command.

I compiled 64 Bit NetBSD Kernel and 64 Bit NetBSD File System.

B. Porting NetBSD into Cloud MiddleWare:

Porting NetBSD into Cloud Middleware involves bundling , uploading and registering Kernel, RamDisk and Machine Image into Cloud setup.

The NetBSD Image has been uploaded and a sample Virtual Machine was run Successfully in our Cloud Setup (192.168.1.6).

Refer : http://blog.netbsd.org/tnf/entry/netbsd_now_runs_under_amazon

By following this procedure, the following version of NetBSD Image was built.

Version	NetBSD 6.99.8
Kernel	XEN3_DOMU
Kernel Version	NetBSD 6.99.8 NetBSD 6.99.8 (XEN3_DOMU) #0: Fri Jun 29 21:55:59 IST 2012 root@pancdaccloud:/home/src/usr/obj/sys/arch/amd64/compile/XEN3_DOMU amd64
Architecture	amd64 / 64 Bit Guest Virtual Machine

Working Components :

1. The Network Interface is **xennet0**
2. IP Address was obtained successfully via **dhclient** command.
3. The NetBSD Guest Virtual Machine is able to connect to outside Network; Machines in outside network are also able to connect to the NetBSD Guest Virtual Machine .
4. The File System details are as follows.

Porting NetBSD as Virtual Machine

Filesystem	Size	Used	Avail	%Cap	Mounted on
root_device	255 MB	135 MB	107 MB	55%	/
tmpfs	1.4 MB	632 KB	840 KB	42%	/dev

Issues Faced:

1.The NetBSD Guest is booted in Single User Mode, which disables **root** user to create / delete files / directories.The Filesystem is mounted in **read- only mode** .

Common Issues:

1. There are certain places where Human Intervention is required.While NetBSD Virtual Machine Guest is being booted, at first it asks for default Interpreter (/bin/sh).At this situation, User is required to give a value and press Enter Key.After getting input from the User, System Services are getting booted. When the NetBSD Image is uploaded into Cloud,the IP Address will always be shown as 0.0.0.0, and the User is required to login to the Node Controller,Take a console of the Virtual Machine, specify the Interpreter and run **dhclient** .But in real time scenario,User logging into the Node Controller is impossible.

Attempted Tasks:

The following approach was also performed when building NetBSD Image.

1. In both the Cases, all the files were mounted in / .
2. To reduce the size of /, the following folders were mounted in different mount points.

Folder	Mount Point
usr	/usr
tmp	/tmp
root	/root
home	/home

The Same problems discussed here were faced.

Porting NetBSD as Virtual Machine

Any help much appreciated.

Thanks in advance

Dhanesh