

NetBackup Appliance Lab - v0.3.docx

Version Table:

Version	Date	Who	Notes
0.1	01-Jan-2014	sdo	Started developing these notes during early 2014.
0.2	(many)	sdo	Many updates, over the following months.
0.3	21-Jan-2015	sdo	Shared via forum.

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1 Development History

1.1 To Do

- Document test using seedutil (see: <https://www-secure.symantec.com/connect/forums/netbackup-seeding-and-server-refresh-and-data-migration>)
- Document and test a DR recovery of an appliance:
<http://www.slideshare.net/symantec/july17th2013-stepbystep>
- Document/test NetBackup KMS key import/recovery on alternate master.
- Export an NFS mount from MacOSX that appliances can save catalog backup DR email to.
- Determine where date is within BIOS of a real physical NB52x0 appliance
- Several tests/method of LU server...
 - Build and test a RHEL LU server
 - Build and test a Windows LU server
 - can a python webserver work?
 - LU from an appliance?
 - LU from an OpsCenter server
 - https (certificate based?)
- Build and test a RHEL OpsCenter server
- Test an actual NetBackup BMR recovery of a Windows client on appliance master
 - both boot over LAN
 - and boot media
- Test NetBackup KMS on appliance master - will it see a SAS tape drive (on a VMhost) via SCSI pass-through?
- Add a time duration estimate for each section.
- hosts.allow and hosts.deny on appliances and Ubuntu ?
- Use Ubuntu staging guest to host MHVTl ?
- Configure a simple SNMP listener ?
- Configure a simple syslog server ?
- re-direct syslog from appliance to a syslog server
- Document how to setup SSH keys between devices in lab.
- How to configure Mac to prompt whether to mount USB media, or...
 - if not possible then disable auto-mount.
- How to detect whether a client was installed from binaries from an appliance?
- Disabling MacOSX Spotlight.
- What is the default IPMI address for different versions and models of NB52x0 ?
- Finish table of default appliance IP addresses for NB5020 - it did change at some point from 192.168.1.1 to 169.254.x.x).
- Test adding a second node to a SPA to create a larger pool.
- Test upgrade of NB50x0 v1.4.2 appliance to v1.4.4.
- Re-test bonding and routing in NB5020.
- Test whether NB5220 appliance can see/use SAS and/or SCSI tape drives via VMware Workstation 10 on Windows.
- Test client side de-dupe.
- Test accelerator...
- does accelerator now support PDDO, or still only MSDP ?
- Add notes re enabling an Ubuntu VM host as an NTP server.

1.2 Doing

- Get firewall rules exact for Windows.

1.3 Done

- Testing AIR replication, and reverse AIR.
- Install telnet on Windows 2008 R2, and setup firewall rule
- Add steps to setup MacOSX as SMTP relay for emails from OpsCenter and appliances
- Force all emails via SMTP relay to go to one target address
- Steps to overcome the restriction in v7.6.0.2 for: CLISH / support / maintenance
- Added steps re manually replicating images.

- Corrected steps re mounting ISO on MacOSX.
- Added steps re BMR.
- Added steps re NetBackup KMS.
- Re-numbered steps.
- Notes re NB50xx PDDO appliance patch/upgrades.
- Configuring some OpsCenter reports.
- Notes re NB52xx appliance master server patch/upgrades.
- Converted networking to 10.0.9.x
- Re-order build steps for NB52x0 master/media appliances.
- Test upgrade of v2.0.3 appliance to v2.5 and then to v2.5.4 (worked) and then to v2.6.0.1 (didn't work).
- If VM host is Windows, install PuTTY, and add to system path.
- Add note re complications with default passwords and US versus UK keyboards and mappings, i.e. @ versus "
- Additional disk space required for images and folders and ISOs.
- Review and re-test each method of creating bootable ISO, ensure steps are clear and correct.
- Steps to snapshot/clone PDDO appliance.
- Finish build notes and testing for NB5220.
- Creating templates.
- Add table of web resources.
- Add section re configuring environment 'path' on VM host.
- Section re virtual network.
- Re-order each section: Fusion, Workstation, VirtualBox.
- Add minimum disk space requirements.
- Re-organise starting steps, and separate out the creation of bootable ISOs.
- In Ubuntu, how to mount loopback r/o disk image file (from 'dd').
- In Ubuntu, test reading logical and physical USB disk objects and MD5 check.
- Retest grabbing image of USB on MacOSX using /dev/rdiskN.
- compare MD5 vs. image from /dev/diskN.
- Amend all networking to same sub-net 192.168.10.x
- Test a factory reset of NB5020 v1.4.2.
- Setup MacOSX VM host as an NTP server.
- Add OpcCenter Server to lab env.
- Need a VM to act as NetBackup Admin Console - used Windows 2008 R2 SP1.
- Confirmed there is no 'root' login of NB5220 /appliance web admin UI.
- Confirmed that the 'root' login of NB5020 web UI is not the system 'root' account, it is a different root with its own password.
- Tested that v2.0.3 /appliance 'Config UI' does change to an 'admin UI' after successful UI based config of an appliance as a master or media.
- i.e. there are two types/versions/modes of the UI exposed at http://x.x.x.x/appliance
- ...before the appliance has been configured: http://x.x.x.x/appliance is a configuration UI
- ...after the appliance has been configured: http://x.x.x.x/appliance is a management UI
- Test /appliance UI config of master.
- Test CLISH based config of master.
- Test install of v2.0.3 from boot ISO.
- Create boot DVD for NB5220 v2.0.3.
- Test creating boot DVD directly on Mac using the copy of mkisofs v2.0.1 that is bundled with VMware Fusion.
- Extract rpm from tar kits for all NB5220 patch versions, and check md5 (and sha1 if available).

2 Introduction

2.1 Disclaimer

- Neither the author of these notes, nor Symantec, shall be liable for any harm or loss generated by the use and/or mis-use of these notes.
- These notes are not endorsed by Symantec.
- These notes are not supported by Symantec.
- These notes have not been tested by Symantec.
- Use of these notes is entirely at the end user's own risk.
- These notes are free to use and distribute and modify - as long as the front page with version table, and this disclaimer, all remain intact.

N.B... and I can't say this strongly enough - please don't be tempted to do any testing related to these notes in your production backup environment.

Finally. All of the points in this document should be considered as examples only. None of them should be mis-construed as best practice. Best practice is most definitely not the intention of this document. I would be very wary about using anything from this document in a production environment - as just about everything in this document is unjustified, and probably unjustifiable.

2.2 Acknowledgements

Several items in these notes were cobbled together from various sources, especially the notes around:

- Configuring NTP
- Configuring SMTP relay

Sincere apologies to the original authors - as I can no longer locate (on the internet) where I found the above.

If there's anything else in this doc that looks similar to anyone else's work - then apologies, in advance, for that too - but I feel fairly certain that I wrote everything else myself.

2.3 Why Write These Notes?

I put these notes together because it's not very often that I get to actually install and build NetBackup appliances - and once they're in production use, then you'd have to be in a pretty bad place to be contemplating re-imaging an appliance. Basically, once an appliance is configured you rarely have to go back and amend that configuration.

So, essentially, these notes could loosely be considered as training notes, or simply to have something to refer back to when creating new procedures.

FYI - There is very little in this document regarding configuring and using NetBackup policies, schedules, SLPs... nor a whole host of other features of NetBackup. The sole intention of this document was to piece together notes regarding how to create virtual appliances for simple feature testing.

2.4 Versions Used in Testing/Developing These Notes

The principal test VM host used during the development of these notes was an Apple MacBookPro laptop with an Intel Core i7 dual core 2.7 GHz CPU, and with 16 GB DDR3 1333 MHz RAM, and Crucial M500 960 GB SATA-III SSD.

Also tested various steps and stages using VMware Workstation 10 on Windows 2008 R2 SP1 - and also using Oracle VirtualBox 4.3 x86 on Windows 7 Enterprise SP1 x86.

The MBPro, and an Ubuntu 12.04 LTS Desktop x64 (64-bit) virtual machine, were used to test the copying of the USB sticks and also to test the creation of the ISO9660 boot DVDs.

In more detail, the VM hosts tested upon were:

VM Host Software	VM Host			
O/S	CPU	(C,C,T)	RAM	Storage

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VMware Fusion Pro v6.0.3    MacOSX 10.9.2 (64-bit)    Intel Core i7    2.8 GHz
(1,2,4) 16GB DDR3 1333MHz    SATA-III Crucial M500 960GB SSD.
VMware Workstation v10.0.3  Windows 2008 R2 SP1 (64-bit)    Intel Xeon E3-1270v2 3.5 GHz
(1,4,8) 32GB DDR3 1600MHz    LSI 9271-8iCC + CacheCade + BBU + 1024MB Cache (50/50 R/W).
Oracle VirtualBox v4.3.10   Windows 7 SP1 Ent x86 (32-bit)    Intel Core i5-3340M 2.7 GHz
(1,2,4) 4GB ?                SATA-III 2.5" 7200RPM.

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2.5 Assumptions

It is assumed that anyone working this process:

- accepts all liability and responsibility for any loss and/or corruption, and any impact to services.
- understands the risks of using, as root, the 'dd' and 'fdisk' tools - N.B. mistakes will corrupt your appliance USB sticks.
- pays particular attention to detail at the steps involving 'dd' and 'fdisk'.
- has some experience of systems administration.
- is able to notice errors, and not just plough on regardless.
- accepts that these notes are unpolished and fairly rough.
- accepts that these notes serve only as a guide, because even minor variations of h/w, o/s and s/w versions may require...

...adjusting steps and commands, i.e. these notes are not always completely applicable in all scenarios.

- understands that any testing work undertaken is solely at the end user's own risk.
- will not attempt any elements of the following commands/steps/processes within an existing production environment.
- has a fairly good understanding of NetBackup and related terms.
- has a good understanding of the NetBackup compatibility matrices.
- has a good understanding of the version compatibility requirements of NetBackup.
- understands that the more snapshots are taken, and the more that VMs change (e.g. updates and patching,...

...and/or backup data is ingested), then more disk space will be consumed.

2.6 Hardware, O/S and Software Requirements

- VM Host O/S:

Whilst a 64-bit host O/S isn't a requirement, it is recommended to use a 64-bit host O/S (although these steps have also been tested on Windows 7 Ent x86 32-bit) because the O/S within the appliances is 64-bit (actually SuSE EL 10.4 x64 and above). At this time, I have not confirmed whether Oracle VirtualBox for Linux x86 32-bit, nor whether VMware Workstation for Linux x86 32-bit (e.g. on Ubuntu x86) can run 64-bit virtual machines.

- CPU:

- a fairly modern Intel CPU, e.g. Core i5, i7, Xeon E3 etc - i.e. a CPU that supports the CPU virtualization extensions.
- the CPU needs to be a minimum of 2.5 GHz to run a guest VM appliance.
- 2.7 GHz with turbo boost is better.
- 3.5 GHz is ample to run a small lab of three appliances and a console/OpsCenter.

- RAM:

- minimum 4 GB 1300 MHz to be able to run host O/S, VM host software, and one appliance guest.
- recommended 8 GB 1600 MHz to be able to run host O/S, VM host software, and three appliance guests.
- good 16 GB 1600 MHz to be able to run host O/S, VM host software, three appliance guests and a server guest for admin console and OpsCenter.

- storage:

- one 2.5" 7200RPM SATA-II for one appliance (plus host O/S and VM host s/w)
- a fairly modern (year 2012+) SSD for three appliances (plus host O/S and VM host s/w)
- LSI 9271-8iCC (CacheCade) + BBU + n * SATA-II 7200RPM in RAID-5 for many appliances (plus host O/S and VM host s/w)

- at least one USB1/2/3 port (if you are using appliance boot USB sticks).

- at least one Symantec appliance bootable USB stick - OR - a bootable base ISO downloaded from Symantec's FileConnect web site.
- some test NetBackup licences...
 - must have at least an Enterprise Server license for NB52x0 master/media appliances.
 - must have a de-duplication option license for NB50x0 PDDO de-duplication appliances (can also be used for MSDP de-dupe NB52x0).
 - preferably a flexible disk license for NB52x0 AdvancedDisk on master/media.
- regarding host O/S - I suggest using a 64-bit O/S for the VM host, e.g.:
 - MacOSX 10.9.x Mavericks
 - Ubuntu 12.04 LTS Desktop 64-bit
 - Windows 2008 R2 SP1
 - Windows 7 SP1 x64
 - Windows 8 or 8.1 x64
- ...and avoid these as VM host:
 - Ubuntu 12.04 LTS Desktop/Server x86 32-bit
 - Windows 7/8/2008 x86 32-bit
- additional software required:
 - If the VM host is Windows you will need a copy of PuTTY so that you can use ssh for terminal sessions, and pscp for copying files. This is covered later when configuring VM host.

2.7 Disk Space Requirements

On the VM host you will need an absolute minimum of at least 250 GB of real disk space. Although all of the VM guests (servers and appliances) will be using thin provisioned disk, we still need 250 GB just to install all of the O/S and appliance and application software components.

If you will be performing medium to large scale backup testing to confirm dedupe ratios then you obviously need more physical disk space within the VM host to accommodate the expansion growth of the thin provisioned appliances as more and more data is saved within the lab.

Obviously, patching and upgrading appliances and operating systems will consume more disk space. When you consider the size of the appliance patch/upgrade kits (approximately 2 GB for NB50x0, and approximately 8 GB for recent NB52x0 patches) then it should be fairly obvious how much additional disk space you will need.

So, as an absolute minimum for a small lab (without much data, and no patching taking place):

VM host software	5 GB
Ubuntu staging	45 GB
(space for images and ISOs)	50 GB
Console/OpsCenter server	30 GB
Master server appliance	40 GB
Media server appliance	40 GB
PDDO appliance	40 GB

Total	250 GB

2.8 Overview Summary

Firstly, an overview of the process:

- choose a VM host O/S (MacOSX, Windows, Ubuntu, etc...)
- choose VM host software (VMware Fusion, VMware Workstation, Oracle VirtualBox, others ?)
- configure VM host O/S
- install VM host software
- decide VM host software host-only subnet
- configure VM host software host-only subnet
- create VM templates for appliances
- create bootable ISO image(s) (think bootable DVD :)
- will you, or won't you, need an Ubuntu guest ? (...covered in more detail a few lines further down just below...)
- copy VM template to become basis of a new appliance guest...
- if the appliance being built/installed is an NB52x0 - then you WILL need to fudge the date of the BIOS within the VM...

(...N.B. you will need to fudge the virtual machine's BIOS date (NOT the date of the host O/S, and NOT the date in the BIOS of the host O/S...))

- boot the appliance from the bootable ISO image...
- ...IF the appliance is a NB50x0 - then you WILL need to enter a valid NetBackup Deduplication license halfway through the process...
- ...IF the appliance is a NB52x0 - then the build/install will simply run to completion...
- shutdown, and possibly snapshot/clone the appliance to become your base copy of this version of appliance...
- configure appliance...
- happy days! :)

Consider this:

...if your host O/S is MacOSX and you are using VMware Fusion Pro 6
then you will NOT need an Ubuntu guest because we have mkisofs available

...if your host O/S is MacOSX and you are using VirtualBox 4.2
then you WILL need an Ubuntu guest because we need genisoimage in Ubuntu

...if your host O/S is Ubuntu then no matter which VM host software
then you will NOT need an Ubuntu guest because we have genisoimage available

...if your host O/S is Windows then no matter which VM host software
then you WILL need an Ubuntu guest because we need genisoimage in Ubuntu

A bit more detail regarding why and whether you will need an 'Ubuntu 12.04 LTS Desktop x64' guest VM. I guess you could use any Linux distro which has 'dd' (I assume all do), however it MUST also have either the 'genisoimage' or the 'mkisofs' tool available - and if neither of these are natively available then perhaps you can easily download a version of either for your chosen distro. To create bootable ISOs we'll need an O/S capable of successfully reading a block image from Symantec appliance USB sticks (Linux has 'dd').

If your host O/S is MacOSX and you are using VMware Fusion Pro 6, then you are in luck, as you won't need an Ubuntu guest VM to make the ISO boot images, because VMware Fusion Pro 6 luckily includes a copy of the 'mkisofs' tool in the VMware Fusion binaries folder.

If your VM host O/S is MacOSX and you are using Virtual Box, then you will still need an Ubuntu guest VM to create the bootable ISOs, because whilst MacOSX has the 'hdiutil' tool which can create some forms of bootable ISO images, it is not able to create El-Torito no-emulation bootable ISOs that require a 'boot catalog' (it's anyone's guess as to why Apple chose to disable this feature in their version of the genisoimage/mkisofs tool), so we need an O/S environment that has the ability to do this, and Ubuntu is an obvious choice because it natively has available the 'genisoimage' utility (which is itself an extension/fork of the 'mkisofs' tool).

If your host O/S is Windows then you will definitely need to create an Ubuntu guest VM within which to create the bootable ISOs, because Windows doesn't have a simple/native/reliable method for creating a block-by-block complete image of a bootable USB stick, nor a decent/free tool within the vanilla O/S with which to create bootable ISO images.

...so, in summary...

VMware Fusion Pro 6	on	MacOSX	you will NOT need an Ubuntu guest
Oracle VirtualBox 4.3	on	MacOSX	you WILL need an Ubuntu guest
VMware Workstation 10	on	Windows	you WILL need an Ubuntu guest
Oracle VirtualBox 4.3	on	Windows	you WILL need an Ubuntu guest
VMware Workstation 10	on	Ubuntu	you will NOT need an Ubuntu guest
Oracle VirtualBox 4.3	on	Ubuntu	you will NOT need an Ubuntu guest

2.9 Choosing Passwords for the Lab Environment

When creating passwords on the appliances - do not use characters that can be interpreted as meta characters in scripts and Linux CLI, so don't use:

; \ | / # \$ { } [] () ? @ " %

...so probably only simple characters can be used, like:

! * . _ : ~

IMPORTANT:

This next point affects virtual and physical appliances - and also the out-of-band Java based iKVM applet within the IPMI of real appliances. In the U.K., it is quite likely that you will

experience issues entering the default password of 'P@ssw0rd', because the appliances use a U.S. keyboard map - thus - you may think that you are entering a '@' character, whereas in fact you are probably entering a double quote character, i.e. a '"'. So when entering the default password of 'P@ssw0rd', if you get a failure, try entering what would appear to be 'P"ssw0rd'. And, you probably won't want to use either character in the passwords for real or virtual appliances.

IMPORTANT:

During the testing of the configuration of an NB5020 v1.4.2 PDDO appliance as a SPA, when using the /Installer UI, I found that when setting the 'SPA' password during the configuration wizard, that this also actually changes the password for the root account of the normal web admin UI - thus they are one and the same thing. It didn't change the sysadmin account password, nor did it change the password for the O/S root account, nor the Installer UI 'root' account. This confirms that this "SPA + web admin root" account is also the same thing as the "SPA / Management / Users / root" account, and that this 'IS' the 'SPA' root account that NetBackup 'StorageServer' entries authenticate to.

One of the initial stumbling blocks with PDDO appliances is often around understanding which root account is used in which functional areas. Sure, you could set the same strong password on all accounts/areas, but this won't help you in understanding where the functionality of some of the accounts overlaps. I suggest choosing a fairly obscure strong base for the passwords, and then tacking the account name or functional area as text on to the end of your chosen password text string - thus all passwords will have the same strong basis:

...e.g. take this string:
W0tWa51t!

...and then tack the name (or functional area) of the account on the end of the password base, e.g.:

```
...for NB5000/5020/5030:
Area      User      Example Password
----      -
CLISH     sysadmin   W0tWa51t!sysadmin
O/S       root       W0tWa51t!root
Installer UI  root       W0tWa51t!installer
SPA & web admin  root       W0tWa51t!spa
```

```
...for NB5200/5220/5230:
Area      User      Example Password
----      -
CLISH     admin     W0tWa51t!admin
O/S       root       W0tWa51t!root
```

```
...for OpsCenter on Windows 2008 R2:
Area      User      Example Password
----      -
O/S       Administrator W0tWa51t!console
Vx/OpsCenter  admin     W0tWa51t!opsc
```

```
...and if you need an Ubuntu guest (to create bootable ISOs):
Area      User      Example Password
----      -
O/S       myadmin   W0tWa51t!myadmin
```

The above approach really helps identify which admin and which root accounts really are used by the different CLI, CLISH and web UI areas of the appliances.

And such a process will probably help in the real world too, i.e. you could also use the same approach for the IPMI root password on real appliances, e.g.:

```
Area      User      Example Password
----      -
IPMI      root       W0tWa51t!ipmi
```

...to differentiate the password for this 'root' account from the other 'root' accounts on the appliances.

N.B. As already stated above, re NB50x0 PDDO appliances... we know that the O/S 'root' account is

different from the web-admin/SPA 'root' account, which is different to the Installer UI 'root' account. Compare this with the fact that, for NB52x0 master/media server appliances, the CLISH 'admin' account is the same as the 'admin' account used for the <http://x.x.x.x/appliance> web based configuration/web-admin UI.

2.10 Components of the Lab Environment

As a minimum the following makes a decent sensible small lab to test various features of NetBackup:

HostName	Model	Purpose
-----	-----	-----
vmhost	-	VM host software (Fusion, Workstation, VirtualBox), provides private subnet.
staging	(VM)	(...if required...) an Ubuntu guest VM within which to create bootable ISOs.
console	(VM)	For NetBackup Admin Console and OpsCenter Server.
master1	NB52x0	NetBackup Master Server.
medial	NB52x0	NetBackup Media Server.
spal	NB50x0	PDDO Deduplication Appliance.

And later, you could also use the VM host, and the staging and console guests, as NetBackup clients for testing.

2.11 Virtual Lab Networking

Note the following points from different NetBackup manuals:

From: NetBackup Appliance 52xx v2.6.0.1 Release Notes

An issue can occur where policies cannot be viewed or changed on the NetBackup-Java Administration Console and policies fail with a status code 811. The nbpem process and the nbvmtmgr process also go down. This issue occurs on the appliance when the 192.168.1.1 default address is set to eth0 and another system on the network has the same internal address.

From: NetBackup Appliance 52xx v2.6.0.2 Release Notes

NetBackup Appliance does not support running any network configuration in the same range as the administrator interface on eth0. If you want to set up a private network in the 192.168.x.x range, you need to specify a non-default IP address for eth0 that is not in the 192.168.x.x range.

To avoid the issues above, throughout the rest of these notes, two networks will be referred to (but you may well already have, and want to use, your own):

10.0.1.0/24	Main LAN, can reach internet, the VM host is itself in this LAN.
10.0.9.0/24	Virtual, host-only, LAN provided by the VM host software - private (i.e. cannot reach/route to internet).

There is no requirement that you use the same subnets as above, they are just the ones within which I have performed some testing - so feel free to choose and use whatever suits you best.

Decide upon a subnet to use for your lab. A /24 subnet should be enough, and it is probably best to keep it simple and just choose a private network subnet that you haven't used before, and not to split your own existing home/work/lab network into two or more further subnets.

All appliances (that I have seen so far), be they physical or virtual, will always assign an automatic address to eth0. When the appliance is up and running this default grip on eth0 CANNOT be released nor changed, UNLESS another IP address is first configured on another NIC within the appliance. So, we always have to configure at least two virtual NICs on our guest VM appliances, be they a NB50x0 PDDO appliance or a NB52x0 server appliance.

FYI - the appliance guest VMs have no concept/equivalent of an IPMI (e.g. ILO/ILOM/ALOM), what we have instead is the virtual machine's console within the VM host software.

I am assuming that IF you were to cable up only 'eth1' of a real physical appliance, then the appliance would grab this port for its own default internal base IP address, so, without at least two real physically cabled working UP/UP network connections - then you won't be able to actually successfully configure a real appliance. IMO, for real physical appliances - you MUST always configure and cable at least two (not including IPMI) physical NICs - and of course, if an IPMI is available, then you should always cable up the IPMI (except the first generation NB5000 appliance which doesn't actually have a physical IPMI).

...so, in summary...

real physical appliances require...

three working UP/UP cabled LAN NICs: ethN, ethN plus IPMI (except 1st gen. NB5000)

virtual guest appliances require...
two virtual NICs: ethN, ethN

2.12 Choosing a VM Guest O/S for the Admin Console / OpsCenter

NB52x0 NetBackup master/media server appliances do not have a GUI based NetBackup admin console, and you cannot run jnbSA back over X11 over ssh/PuTTY, as this isn't supported from NB52x0 NetBackup master or media servers. So, to keep things fairly quick and simple I decided to use a Windows guest VM as the NetBackup admin console, and to also use it for OpsCenter. Of course you could use any supported Linux distro (probably RHEL) as your admin console and OpsCenter server. Or even use your VM host (if it is a supported O/S) for the admin console and OpsCenter - but I wanted to keep everything in it's own private (unable to reach the internet) subnet - so that accidental call homes don't occur.

If using a Windows guest as your admin console and OpsCenter server, then just use the built-in Windows 'Administrator' account, otherwise you'll always have to remember to 'RunAs Administrator' for all of the software installs, and O/S tweaks, and every time you fire up one of the admin consoles (Windows native based or Windows Java based).

2.13 Appliance Upgrade Kits vs. Appliance Client Kits

The v2.6.0.1 NB52x0 base ISO was the last version to pre-include all of the client installer kits. Which is one of the reasons why the size of the base ISO was reduced from 9GB for v2.6.0.1 to around 3GB for v2.6.0.2.

So, since v7.6.0.2, for each NetBackup patch revision, there are now essentially four sets of kits:

- 1) A bootable USB stick that is supplied with each appliance.
- 2) A base download full ISO for re-imaging appliances.
- 3) An upgrade RPM package for upgrading existing appliances.
- 4) A set of 'client installer kits'.

Where to get the above:

- 1) You should receive one with your genuine appliance.
- 2) From Symantec FileConnect, but you will need a valid 'appliance' license serial number.
- 3) Freely available.
- 4) Freely available.

Only the first and second kits can be used to boot an appliance to install itself.

2.14 About the Patch/Upgrade Kits For Appliances

If, later on, you want to perform test patch/upgrades of appliances, here are some more notes re the upgrade patch kits themselves...

For NB50x0 PDDO appliances...

...the single downloaded tar file contains a folder structure, so software patching involves...
...check MD5 of downloaded tar file...
...copy the tar file to the PDDO appliance...
...and then patch/upgrade as per documentation and release notes.

For NB52x0 master/media server appliances...

...the multiple downloaded tar files contain an rpm file, so software patching involves...
...check MD5 of downloaded pre-split tar files...
...join the pre-split tar files together...
...unpack the tar file to extract the rpm package file...
...check MD5 of the rpm package...
...delete the joined tar file (as this can be easily re-created from the pre-split files)...
...then copy the rpm file (not the tar file(s)) to the master/media appliance...
...and then patch/upgrade as per documentation and release notes.

2.15 Rules and Restrictions re Appliances and NetBackup

If you intend to have an NB52xx media server, and you intend to use that media server to perform catalog backups of the master server, then it must at the same version as the master server (see

page 19 of the NetBackup Appliance v2.5.4 Release Notes).

NB52xx appliances used for VMware VADP off-host backups via SAN do not support multi-pathing to SAN LUNs. One possible solution for H/A might be to have/use two NB52xx appliances, the first zoned to the VMware SAN LUNs via fabric A, and the second appliance zoned to the same SAN LUNs via fabric B - thus, from the storage array, the VMware LUNs would probably be presented to at least four hosts in an H/A environment, i.e. probably at least two ESXi hosts and two appliances.

Until at least v2.5.4, NB52xx appliances cannot perform concurrent (two or more) restores of virtual machines - see page 25 of the NB52xx v2.5.4 Release Notes.

The Appliance Release Notes only contain notes relevant/pertinent to appliances - and do NOT contain all notes relevant/pertinent to the related version of NetBackup - thus, you MUST also read and review the NetBackup Release Notes for the NetBackup version related to the version of appliance that you are installing or upgrading to, AND also read and review all prior NetBackup Release Notes in that same major version family.

As of at least NB52xx v2.5.4 and OpsCenter v7.5.0.7, IE10 (Internet Explorer 10) is not supported for use with the web admin user interfaces. v2.6.0.1 onwards support IE8 to IE11.

2.16 Add 'hosts' File Entries on VM Host and Guests (Appliances and Servers)

A requirement of the Symantec NetBackup NB50x0 PDDO Deduplication Appliance is that it have an FQHN. Seeing as the lab subnet will always be mostly private (at least the appliances will be off-internet), I decided to simply fudge FQN naming by specifying hosts file entries on, and for, all of the nodes (VM host, staging, console, master, media and SPA). You don't have to use a spoof domain of 'me.com', so use whatever you want. In the current version of these notes I haven't set about using DNS, but don't let that stop you from using DNS if you already have a suitable working DNS.

Assuming that you won't be using DNS, then you will need at least some hosts file entries, and it is probably a good idea - if you are not using DNS - to apply these hosts file entries to the VM host and also to all related guest VMs (staging, console, master, media, SPA).

For VM Host and VM Guest Servers

sudo vi /etc/hosts

...or...

notepad C:\Windows\System32\drivers\etc\hosts

```
10.0.9.1    vmhost.me.com    vmhost
10.0.9.8    staging.me.com   staging          # assuming this is needed.
10.0.9.9    console.me.com   console
10.0.9.10   master1.me.com   master1
10.0.9.11   media1.me.com    media1
10.0.9.12   spa1.me.com      spa1
```

...or, maybe, for a larger lab...

```
10.0.9.1    vmhost.me.com    vmhost
10.0.9.140  console.me.com    console
10.0.9.141  master1.me.com    master1
10.0.9.142  master2.me.com    master2
10.0.9.143  media1.me.com     media1
10.0.9.144  media2.me.com     media2
10.0.9.145  spa1.me.com       spa1
10.0.9.146  spa2.me.com       spa2
10.0.9.147  client1.me.com    client1
10.0.9.148  client2.me.com    client2
10.0.9.149  staging.me.com     staging
```

For Guest VM Appliances and Guest VM Servers

Later, during the initial appliance configuration steps, we will use the CLISH to add hosts file entries.

We will also add hosts file entries during the install/config of the additional servers (staging,

console).

2.17 Other Points to Note

2.17.1 Do NOT Mix Client Installer Types

<http://www.symantec.com/business/support/index?page=content&id=TECH211140>

If you have a client that is installed with a non-appliance version of NetBackup, do not upgrade it from the appliance. Make sure that you upgrade that client with a non-appliance version of NetBackup.

If you have clients that were installed from a NetBackup appliance 2.0, 2.0.x, 2.5, 2.5.1, 2.5.2, or 2.5.3 version then you should use the NetBackup appliance 2.5.4 version software to upgrade the client. Do not use a non-appliance NetBackup update to upgrade the client.

(Q: How to distinguish whether a client was installed using binaries from an appliance vs. traditional binaries?)

2.18 Web Resources

2.18.1 VMware Fusion

VMware Fusion Main Page

<http://www.vmware.com/uk/support/fusion/>

VMware Fusion Documentation

<http://pubs.vmware.com/fusion-6/index.jsp>

VMware Fusion Release Notes

<https://www.vmware.com/support/fusion6/doc/fusion-60-release-notes.html>

<https://www.vmware.com/support/fusion6/doc/fusion-601-release-notes.html>

<https://www.vmware.com/support/fusion6/doc/fusion-602-release-notes.html>

<https://www.vmware.com/support/fusion6/doc/fusion-603-release-notes.html>

2.18.2 VMware Workstation

VMware Workstation Documentation

https://www.vmware.com/support/pubs/ws_pubs.html

VMware Workstation 10 Release Notes:

<https://www.vmware.com/support/ws10/doc/workstation-10-release-notes.html>

<https://www.vmware.com/support/ws10/doc/workstation-1001-release-notes.html>

<https://www.vmware.com/support/ws10/doc/workstation-1002-release-notes.html>

2.18.3 Oracle VirtualBox

Oracle VirtualBox Main Page

<https://www.virtualbox.org/>

Oracle VirtualBox Download

<https://www.virtualbox.org/wiki/Downloads>

2.18.4 NetBackup

NetBackup Main Page

<http://www.symantec.com/business/support/index?page=landing&key=15143>

NetBackup Compatibility Matrices

<http://www.symantec.com/business/support/index?page=content&id=TECH59978&key=15143>

NetBackup Appliances

<http://www.symantec.com/business/support/index?page=landing&key=58991>

NetBackup Appliance Patch Downloads

<http://www.symantec.com/business/support/index?page=content&id=TECH150251&key=58991&basecat=DOWNLOADS&actp=LIST>

Symantec File Connect

<https://symantec.flexnetoperations.com>

NetBackup User Forum

<http://www.symantec.com/connect/backup-and-recovery/forums/netbackup>

3 Preparing the Virtual Host Environment

3.1 Install VM Host Software

Perform a typical install of your VM Host software (e.g. VMware Fusion, VMware Workstation, Oracle VirtualBox).

However, during installation you may wish to choose to locate your repository for virtual machines on another mount-point, volume or drive.

Next, we need to configure some elements of the host O/S CLI so that the path to the binaries that we need is always present.

Of course, if you choose to install the VM host software on a different drive or path, then you will need to modify the paths used below.

Do one of the following four before continuing with step 2.1.5

3.1.1 VMware Fusion on MacOSX 10.9.2 Mavericks

Edit your login profile file:

```
$ cd ~
$ ls -lash
$ vi .profile
PATH=${PATH}:/Applications/VMware\ Fusion.app/Contents/Library/
export PATH
<esc>:wq!
```

...then execute it with:

```
$ chmod 755 .profile
$ echo $PATH
$ . ~/.profile
$ echo $PATH
```

...test that you are now able to execute without having to specify the path every time:

```
$ vmware-vmx -version
```

3.1.2 VMware Workstation on Windows 2008 R2 SP1

Start -> Run -> sysdm.cpl

Select 'Advanced' tab

Click on 'Environment Variables...'

In the second lower panel named 'System variables' scroll down to, and select 'Path' and select 'Edit...'

Now in the edit box, select 'Variable value:' and scroll to the right to the end, and append this following path (note the leading semi-colon):

```
;C:\Program Files (x86)\VMware\VMware Workstation
```

Click 'OK' to save

Click 'OK'

Click 'OK'

...and to test, you can...

Start -> Run -> cmd

```
> path
```

```
> vmware-vmx -version
```

3.1.3 Oracle VirtualBox on MacOSX 10.9.2 Mavericks

start a Terminal session on the Mac...

```
cd ~
```

```
cat .profile
```

```
vi .profile
```

```
PATH=${PATH}:/Applications/VirtualBox.app/Contents/Library/
```

```
export PATH
```

```
<esc>:wq!
```

```

chmod 755 .profile

echo $PATH
. ./profile
echo $PATH

vboxmanage -version

```

3.1.4 Oracle VirtualBox on Windows 2008 R2 SP1

```

Start -> Run -> sysdm.cpl
Select 'Advanced' tab
Click on 'Environment Variables...'
In the second lower panel named 'System variables' scroll down to, and select 'Path' and
select 'Edit...'
Now in the edit box, select 'Variable value:' and scroll to the right to the end, and append this
following path (note the leading semi-colon):
    ;C:\Program Files\Oracle\VirtualBox
Click 'OK' to save
Click 'OK'
Click 'OK'

...and to test, you can...
Start -> Run -> cmd

path
vboxmanage -version

```

3.1.5 And, If the VM Host is Windows, then Install PuTTY

```

# download PuTTY:
http://www.chiark.greenend.org.uk/~sgtatham/putty/

# install PuTTY...

# configure system path...
Start -> Run -> sysdm.cpl
Select 'Advanced' tab
Click on 'Environment Variables...'
In the second lower panel named 'System variables' scroll down to, and select 'Path' and
select 'Edit...'
Now in the edit box, select 'Variable value:' and scroll to the right to the end, and append this
following path (note the leading semi-colon):
    ;C:\Program Files\PuTTY
Click 'OK' to save
Click 'OK'
Click 'OK'

...and to test, you can...
Start -> Run -> cmd

path
pscp -V          # to show version.

```

3.1.6 Install Telnet Client on Windows 2008 R2 (if you want)

```

> pkgmgr /iu:"TelnetClient"

> netsh advfirewall firewall add rule name=telnet-out dir=out action=allow protocol=TCP
localport=any localip="10.0.9.0/24" remoteport=any remoteip="10.0.9.0/24" profile=private
program="%SystemRoot%\System32\telnet.exe" interface=lan

```

3.2 Configure VM Host

3.2.1 Disable Sleep On VM Host

If the VM host goes to sleep then appliance VMs may be interrupted, which will lead to unpredictable results, especially during the fairly time consuming (sometimes 50 minutes plus) base installs and also the patch/upgrade installations.

To disable sleep within the O/S of the VM host...

- ...on MacOSX 10.9.2 Mavericks...

- ...System Preferences -> Energy Saver -> Computer sleep -> Never

- ...on Windows 2008 R2 SP1...

- Start -> Run -> powercfg.cpl

- Click: Change when the computer sleeps

- Put the computer to sleep: Never

- ...and for any other VM host O/S do something similarly appropriate.

3.2.2 Configure a Host-Only (Private) Network Within the VM Host Software

With Fusion, Workstation and VirtualBox we have the ability to create a private 'host-only' network.

N.B. The VM host software itself also acquires an address in this network, and this address also acts as the subnet gateway.

Depending upon your env, do one of the following.

3.2.2.1 VMware Fusion Pro on MacOSX

From the VMware Fusion application menu bar:

- VMware Fusion -> Preferences...

- Click on the 'Network' icon

- Click on Click the lock to make changes

- Click on '+' to add a network

- No do not allow NET edge traversal

- Yes connect host Mac to this network

- Yes provide subnet and mask

- 10.0.9.0

- 255.255.255.0

3.2.2.2 VMware Workstation 10 on Windows

From the VMware Workstation menu bar...

- Edit

- Virtual Network Editor...

- Add Network...

- Select a network name, e.g. VMnet10, and click OK

- ...which creates a 'Host-only' network, now change the IP address range...

- Ensure that 'Connect a host virtual adapter to this network' is ticked/selected...

- Change 'Subnet IP:' to: 10.0.9.0

- Click 'DHCP Settings...' and change to 10.0.9.128 to 10.0.9.254

- ...and change both lease time to 63 days 0 hours 0 mins 0 seconds.

- ...and click OK

- ...click 'Apply', and click OK

3.2.2.3 Oracle VirtualBox on Windows

From the Oracle VirtualBox menu bar...

- File

- Preferences...

- Network

- ...then the 'Host-only Networks' tab

- Select 'VirtualBox Host-Only Network Adapter'

- ...then click the 'screw-driver' icon...

- ...in the 'Adapter' tab...

- Ensure 'IPv4 Address' is 10.0.9.1 (N.B. not 10.0.9.0 !)

- Ensure 'IPv4 Network Mask' is 255.255.255.0 (if you are using /24 subnet)

- ...select the 'DHCP Server' tab...

```
...and adjust the address and ranges to use your 192.168.10.x network
Click OK
Click OK
```

3.3 Enabling VM Host as an NTP Server

N.B. Having a working NTP server in a VM based lab is not strictly necessary - as all of the VM host software have an option to keep the time up to date within the guest VMs. So, if you don't have time to configure NTP, then skip these next NTP server related steps...

These all appeared to work:

NTP Client	NTP Server	Worked
-----	-----	-----
VM guest NB5220 v2.0.3, NB5020 v1.4.2	VM host MacOSX 10.9.2	yes
VM guest NB5220 v2.0.3, NB5020 v1.4.2	VM guest Windows 2008 R2 SP1	yes
VM guest Windows 2008 R2 SP1	VM host MacOSX 10.9.2	yes
VM guest Windows 2008 R2 SP1	Other host Windows 2008 R2 SP1	yes

3.3.1 MacOSX 10.9.2 VM Host as NTP Server

```
# stop NTP...
sudo launchctl unload /System/Library/LaunchDaemons/org.ntp.ntpd.plist

# allow queries...
sudo vi /etc/ntp-restrict.conf
...remove the 'noquery' options from first two lines...
<esc>:wq!

# add a time server...
cat /etc/ntp.conf
...are any time servers listed, if not add one/some, e.g...
sudo vi /etc/ntp.conf
server time.euro.apple.com minpoll 12 maxpoll 17
<esc>:wq!

# add some 'restrict' lines, which actually allows traffic...
sudo vi /private/etc/ntp-restrict.conf
...add these lines after the other restrict lines...
restrict 10.0.0.0 mask 255.0.0.0
<esc>:wq!

# allow time serving...
sudo vi /etc/hostconfig
...and ensure these two lines are both '-YES-'...
TIMESYNC=-YES-
TIMESERV=-YES-
<esc>:wq!

# restart NTP...
sudo launchctl load /System/Library/LaunchDaemons/org.ntp.ntpd.plist

# wait 3 to 4 minutes...
date

# check ourself (i.e. MacOSX as VM host), check via both our own IP, and our VM host address...
ifconfig
sudo ntpdate -u 10.0.1.x
sudo ntpdate -u vmhost
ntpq -p

# FYI - I have seen posts detailing that on MacOSX 10.9(.x) Mavericks that the ntp(d) daemon is
flakey.
# ...indeed - I have had time drift on appliances, until NTP was restarted on the MacOSX VM host
using:
sudo launchctl unload /System/Library/LaunchDaemons/org.ntp.ntpd.plist
sudo launchctl load /System/Library/LaunchDaemons/org.ntp.ntpd.plist
ntpq -p
```

3.3.2 Windows 2008 R2 SP1 VM Host as NTP Server

Here we will configure the VM host as a time server, and enable logging...
Later we will configure the guest VMs to use this host as their time server (via the VM host-only network gateway IP of 192.168.10.1)

```
# first some pre change shows/lists, some of these may not work yet...
net start | find /i "time"
reg query "HKLM\SYSTEM\CurrentControlSet\Services\W32Time" /s
w32tm /dumpreg
w32tm /tz
w32tm /query /source
w32tm /queue /peers /verbose
w32tm /query /status /verbose
w32tm /query /configuration /verbose
sc queryex w32time
sc qc w32time

# stop, unregister, re-register...
net stop w32time
w32tm /unregister
w32tm /register

# configure and test...
w32tm /config /manualpeerlist:"time.euro.apple.com time.apple.com" /syncfromflags:MANUAL
/reliable:yes
w32tm /debug /enable /file:"C:\w32tm.log" /size:10240 /entries:300
reg add "HKLM\SYSTEM\CurrentControlSet\Services\W32Time\TimeProviders\NtpServer" /v "Enabled" /t
REG_DWORD /d 0x1
sc triggerinfo w32time start/networkon stop/networkoff
net start w32time

# for some reason it needs to bounce once before it will start writing to the log file...
net stop w32time
net start w32time
net start | find /i "time"
w32tm /query /source
w32tm /queue /peers /verbose
w32tm /query /status /verbose
w32tm /query /configuration /verbose
w32tm /tz
w32tm /resync

reg query "HKLM\SYSTEM\CurrentControlSet\Services\W32Time" /s
w32tm /dumpreg

date /t
time /t

more C:\w32tm.log

eventvwr /f:"<QueryList><Query Id='0'><Select Path='System'>*[System[Provider[@Name='Microsoft-
Windows-Time-Service']]]</Select></Query></QueryList>"
```

3.3.3 Ubuntu 12.04 LTS Desktop x64 VM Host as NTP Server

(tbc)

3.4 Initial Setup of an Ubuntu Guest (...if this is required to create bootable ISOs...)

This will be our 'staging' machine - we only really need this guest VM if we don't have downloaded appliance ISO files (from Symantec FileConnect) to hand, and all that we have are bootable appliance USB sticks.

If you have downloaded ISO boot files to work with, then follow this link to section: [3.6](#)

3.4.1 Initial Install

```
# download Ubuntu 12.04 LTS Desktop 64-bit...
```

```
http://releases.ubuntu.com/12.04/
```

```
# create a new VM... but remember to keep one virtual NIC in the local network...    in my env this  
acquires an address in    10.0.1.x
```

```
# ...and a second virtual NIC in the VM host only network...    in this lab  
this will have the address    10.0.9.8
```

```
# ...and then just take all the defaults offered by the VM host software for the other options...
```

```
# ...and choose an account name of 'myadmin'...
```

```
# ...then boot, install, login, start a Terminal session, then...
```

```
# add hosts file entries...
```

```
sudo vi /etc/hosts
```

```
10.0.9.1    vmhost.me.com    vmhost
```

```
10.0.9.8    staging.me.com    staging
```

```
10.0.9.9    console.me.com    console
```

```
10.0.9.10   master1.me.com    master1
```

```
10.0.9.11   medial.me.com    medial
```

```
10.0.9.12   spal.me.com    spal
```

```
# specifically set NIC2 to 10.0.9.8, netmask /24, and with a gateway of 10.0.9.1
```

```
# now test ping to internet and VM host which provides our subnet/gateway...
```

```
ping www.google.com
```

```
ping vmhost
```

```
# set a normal scroll bar for desktop UI windows on Ubuntu 12.04...
```

```
gsettings set org.gnome.desktop.interface ubuntu-overlay-scrollbars false
```

```
    ...FYI - for a normal scroll bar in Ubuntu 13.10, use...
```

```
gsettings set com.canonical.desktop.interface scrollbar-mode normal
```

```
# list package sources...
```

```
cat /etc/apt/sources.list
```

```
# un-install stuff that we don't need...
```

```
sudo apt-get remove aisleriot
```

```
sudo apt-get remove deja-dup*
```

```
sudo apt-get remove gnome-mines
```

```
sudo apt-get remove gnome-orca
```

```
sudo apt-get remove gnome-sudoku
```

```
sudo apt-get remove gwibber*
```

```
sudo apt-get remove "^libreoffice-*
```

```
sudo apt-get remove mahjongg*
```

```
sudo apt-get remove rhythmbox*
```

```
sudo apt-get remove shotwell*
```

```
sudo apt-get remove simple-scan
```

```
sudo apt-get remove telepathy*
```

```
sudo apt-get remove thunderbird*
```

```
sudo apt-get remove totem*
```

```
sudo apt-get remove transmission-*
```

```
sudo apt-get remove ubuntuone*
```

```
sudo apt-get remove unity-lens-*
```

```
# ...and remove the following from Ununtu 14.04 LTS...
```

```
sudo apt-get remove "^zeitgeist-*
```

```
# remove details of packages no longer required...
```

```
sudo apt-get autoremove
```

```
sudo apt-get autoclean
```

```
# refresh the package list...
```

```
sudo apt-get update
```

```
# updates already installed packages...
```

```
# (this does not perform a major version upgrade, if you do want a major version upgrade to Ubuntu,  
then use:  sudo apt-get -u dist-upgrade)
```



```

sudo apt-get upgrade

# install some packages that we need...
sudo apt-get install dkms
sudo apt-get install inetutils-traceroute

# reduce mtu, so that we can VPN...
sudo ifconfig eth0 mtu 1280

# in desktop GUI Settings / Privacy, and disable all logging and reporting...

# in desktop GUI Settings / Network - make IPv6 "link-local only"...

# if you have a syslog server...
# Forward logging to syslog server...
sudo vi /etc/rsyslog.d/50-default.conf

# and add line...
*. * @x.x.x.x:514

# restart syslog daemon...
sudo service rsyslog restart

# send a test message directly...
echo '<14> test1' | nc -v -u -w0 x.x.x.x 514

# generate a log event locally, which should get forwarded...
logger "test2"

```

3.4.2 Add A New Disk

```

# shutdown Ubuntu guest...
sudo shutdown -h now

# use VM host software to add a 100GB disk, we need a fair amount of space because we will be
manipulating contents of largish USB sticks...

# use VM host software to power on Ubuntu staging guest...

# logon and start a terminal session...

# create partition on second disk (be careful here - I have assumed that the Ubuntu guest that you
created only has one disk already)...
# ...so I have assumed that the new 100GB disk will be on disk channel 'b'...
sudo fdisk /dev/sdb
?
n
...take defaults
w

# create file system...
sudo mkfs -t ext3 /dev/sdb1

# create a folder to act as a mount point...
sudo mkdir /disk2

# get the UUID of the new disk...
ls -l /dev/disk/by-uuid/
sudo blkid

# add the UUID to fstab so future reboots will automount the disk...
sudo vi /etc/fstab
UUID /disk2 ext3 defaults 0 2

# mount it now...
sudo mount -a

# check...

```

```
cd /disk2
df -h .

# update perms...
sudo chown myadmin /disk2
sudo chgrp myadmin /disk2
```

3.4.3 Configure SSH Daemon

```
# you will need this because later we will want to be able to pull/copy the created bootable ISO
down to the VM host...
sudo apt-get install openssh-server
sudo cp /etc/ssh/sshd_config /etc/ssh/sshd_config.saved
sudo ufw enable
sudo ufw allow 22
...or...
sudo iptables -A INPUT -p tcp --dport ssh -j ACCEPT
sudo ufw status
sudo service ssh restart
```

3.5 How To Create Bootable ISO from NetBackup NB5xx0 Bootable USB Sticks

N.B: Skip this whole section IF you are going to be using bootable ISO's that you downloaded from FileConnect using a valid appliance serial number; if so, then follow this link to section: [3.6](#)

Do NOT insert the USB stick yet - wait until the appropriate step says to do so, below.

FYI - The steps below show the creation of an ISO image of an NB50x0 PDDO Deduplication Appliance USB stick...

...but in the examples the version is shown as 'v1.4.x', so change this to whichever version you are working with...

The process is exactly the same for an NB52x0 Master/Media Appliance USB stick...
...just change NB50x0 to NB52x0, and change the version number.

N.B. In the steps below - pay careful attention to device letters and numbers.

You will be using the 'dd' command - which has the ability to effectively overwrite disks, destroy partitions and lose data.

There are two methods described in this section:

- method 1, **IF** your VM host is VMware Fusion Pro 6 on MacOSX
...then use the Mac, as there is no need for an Ubuntu staging guest within which to create the bootable ISO.

- method 2, **IF** your VM host is anything else on any O/S
...then use an Ubuntu staging guest VM within which to create the bootable ISO.

An overview of the steps:

```
# method 1:
# make an image of the USB stick
# convert IMG to DMG
# mount the DMG read-only locally on Mac
# copy contents (because isolinux.bin gets modified)
# use mkisofs from VMware Fusion to create the bootable ISO
#
# method 2:
# make an image of the USB stick
# mount the image read-only via loopback
# copy contents (because isolinux.bin gets modified)
# use genisoimage from Ubuntu to create the bootable ISO
```

3.5.1 How to Create NB50x0 Bootable ISO - IF - the VM Host is VMWare Fusion on MacOSX

On MacOSX, when a USB stick is inserted, the device is initially attached to the O/S as a raw disk /dev/**r**diskN. Then the logical disk system driver takes over and the physical raw USB stick /dev/**r**diskN is attached as a logical disk device /dev/diskN (note the lack of '**r**' in the logical device name). Then the file system driver takes over and any file systems present on the logical disk are mounted. Normally one would use (read and write files) a USB stick via the file system (which performs I/O via the logical disk drive - which in turn performs I/O to the raw physical device), because the file system driver maintains locking and writing to ensure that the file system (folders and files) remains consistent.

However, if we unmount the file system from the logical /dev/diskN object then we are free to read the physical raw /dev/**r**diskN object safe in the knowledge that nothing will be writing to the file system, because it is no longer mounted. We do this because reading a physical raw /dev/**r**diskN object is, on a Mac, much faster than reading via the buffered logical /dev/diskN device layer.

The steps below also show the difference in performance, and that both images of the USB stick are indeed exactly the same.

You don't have to take a second copy (but I have included the steps below - just in case you want to prove it to yourself too).

```
# begin by inserting the appliance USB stick, and MacOSX will auto-mount the file system...

# fire up a 'Terminal' session on the Mac, and list disks, and unmount any file systems from the
logical disk...
# ...the unmountdisk command option does not 'unmount' a disk per se, what it does is unmount *all*
file systems from the /dev/diskN object...
# ...i.e. we don't have to specify which file systems to unmount from which partitions, the
unmountdisk option on Mac just unmounts them all for the specified disk...

# firstly, list all disks, and identify the 'N' that has been assigned to the NB5xx0 USB stick...
diskutil list

# now unmount any file systems that were auto-mounted from the buffered logical disk layer, when
the USB stick was inserted...
diskutil unmountdisk /dev/diskN

# now make a disk image of the USB stick via the faster raw disk interface...
cd ~
time sudo dd if=/dev/rdiskN of=NB50x0-v1.4.x.img bs=1m conv=notrunc
    7640+0 records in
    7640+0 records out
    8011120640 bytes transferred in 308.974221 secs (25928120 bytes/sec)
    real 5m14.719s
    user 0m0.034s
    sys 0m7.995s

# if you want to, you can also take a copy via the slower buffered logical disk layer, to prove
that both produce the same image...
# ...and to see how much slower it is reading through/via the logical buffered device...
time sudo dd if=/dev/diskN of=NB50x0-v1.4.x-copy2.img bs=1m conv=notrunc
    7640+0 records in
    7640+0 records out
    8011120640 bytes transferred in 1225.188605 secs (6538684 bytes/sec)
    real 20m28.938s
    user 0m0.043s
    sys 1m52.869s

# if you did take a second copy, now compare check sums for both images...
md5 NB50x0-v1.4.x*.img
    MD5 (NB50x0-v1.4.x.img) = 0203c2364e5df775ffb1ab09b6a4b2a8
    MD5 (NB50x0-v1.4.x-copy2.img) = 0203c2364e5df775ffb1ab09b6a4b2a8

# if you did take a second copy, just to prove things to yourself, now delete the unnecessary
second copy...
rm -v NB50x0-v1.4.x-copy2.img
```

```

# now use Mac tool to check the image...
hdiutil imageinfo NB50x0-v1.4.x.img

# convert the raw disk image to DMG (a proprietary MacOSX 'Disk Manager' container format) so that
it can be mounted next...
hdiutil convert NB50x0-v1.4.x.img -format UDRO -o NB50x0-v1.4.x.dmg

# attach/mount the DMG file...
hdiutil attach NB50x0-v1.4.x.dmg -readonly -mount required

# list the mounted disk...
diskutil list
ls -lash /Volumes

# create a folder to act as a temporary store of contents of copied USB stick...
mkdir NB50x0-v1.4.x

# copy contents from mounted image to folder...
cp -rv /Volumes/NB5020/* ./NB50x0-v1.4.x/

# list disks, and unmount/detach the /dev/diskN upon which the DMG file is mounted...
diskutil list
hdiutil detach /dev/diskN
diskutil list

# delete the MacOSX format DMG that we no longer need...
rm NB50x0-v1.4.x.dmg

# save a copy of the boot binary, because the mkisofs command will actually change the contents of
this file...
# ...specifically, the mkisofs command will write the 'boot.catalog' within special pre-defined
blocks within the boot binary isolinux.bin...
cp -v NB50x0-v1.4.x/boot/x86_64/loader/isolinux.bin ./isolinux.bin-NB50x0-v1.4.x

# step in to the folder, because the mkisofs command needs to be able to reference the boot loader
with a path that must begin with 'boot/...'
# make boot ISO image...
cd NB50x0-v1.4.x
chmod u+rw boot/x86_64/loader/isolinux.bin

# make bootable ISO (this next command is all on one line)...
mkisofs -r -J -l -no-emul-boot -boot-load-size 4 -boot-info-table -b
boot/x86_64/loader/isolinux.bin -c boot/boot.catalog -o ../NB50x0-v1.4.x.iso ./

# clean-up, but be careful here - you should be in the folder /NB50x0-v1.4.x...
pwd
rm -rf *
cd ..
rmdir NB50x0-v1.4.x

# delete the previously saved copy of isolinux.bin...
rm isolinux.bin-NB5xx0-v9.9.9

# test mounting the bootable ISO image...
hdiutil mount NB50x0-v1.4.x.iso
du -h /Volumes/CDROM | tail
diskutil list
diskutil eject /dev/diskN

```

3.5.2 How to Create NB50x0 Bootable ISO - IF - the VM Host is VMWare Workstation on Windows ...or...

3.5.3 How to Create NB50x0 Bootable ISO - IF - the VM Host is Oracle VirtualBox on MacOSX ...or...

3.5.4 How to Create NB50x0 Bootable ISO - IF - the VM Host is Oracle VirtualBox on Windows ...or...

...and/or maybe something else, then you will probably need an Ubuntu guest VM within which to create bootable ISO images...

FYI - within Ubuntu, we don't have the /dev/~~z~~diskN and /dev/diskN constructs that a Mac has. Instead we have: /dev/sd~~z~~N

where ~~z~~ is a device channel letter (think 'a' for disk1, and 'b' for disk2, and 'c' for disk3, etc...)

where ~~N~~ is a partition number (think 1 for partition1, 2 for partition2, etc...)

And if we want to perform a raw USB stick physical read on Ubuntu, we read the entire disk, e.g. /dev/sdc (note how we don't read using the partition number (e.g. /dev/sdc~~1~~), because reading /dev/sdc (without a trailing digit) will read the entire device, i.e. all blocks, all the way from the MBR on the first sector, on to the partition table/map and then any and all partitions, i.e. all blocks all the way to the end of the USB device.

So far, during testing, I have found that the Symantec Appliance USB sticks only contain one partition, thus so far there has only been a need to unmount one file system. With the first command below (df -h) you will see at least one partition mounted at /media/NB5xx0. Note the device name, it should probably be /dev/sdc if you have followed this guide, but it could possibly be something else if you are using a pre-used Ubuntu guest. As stated above there is usually (so far with the USB sticks that I have used) only one file system mounted, probably at /dev/sdc1). Because future Symantec USB sticks may have more than one partition, you need to look for other file systems also mounted on the same device letter (e.g. if you see /media/NB5xx0 mounted on /dev/sd~~c~~N, then look for other file systems mounted from other /dev/sd~~c~~N partitions - because during the next steps we will want to manually unmount all of the file systems that may have been auto-mounted from the USB stick.

N.B. Remember to change the uppercase 'Z' to whichever lowercase letter your USB stick has been assigned - as it might not be 'c' as used in the description/example above.

obviously we need to keep the original USB in a pristine condition, i.e. in an as original a condition as possible...

...as this will always be our base starting point...

...so, first we need to create a copy of USB stick, and then work with that...

start VM host software...

start the Ubuntu guest, and logon as myadmin, and start a Terminal session...

now physically insert USB stick to VM host...

...and the VM host will ask you to select where to present the USB stick, so...

...select the Ubuntu staging guest VM...

...and the USB will auto mount at /media/NB5020...

...and a folder view will probably auto pop-up, simply close this...

...and we need to logically unmount it (not eject it) so that we can take an image of it...

...so, first list all of the mounted file systems...

df -h

make a note of the device letter (probably '~~c~~' from /dev/sd~~c~~N) and...

...unmount the file system that was auto-mounted by Ubuntu...

umount /media/NB5020

change to the new large disk that we created earlier, i.e. somewhere with enough space for up to three * USB sticks...

i.e. the USB stick image, the extracted contents, and the final product of a ISO image...

cd /disk2

make an image of the entire USB logical disk...

time sudo dd if=/dev/sd~~Z~~ of=Nb50x0-v1.4.x.img bs=1M conv=notrunc

7640+0 records in

7640+0 records out

8011120640 bytes (8.0 GB) copied, 399.828 s, 20.0 MB/s

real 6m39.840s

user 0m0.010s

sys 0m12.298s

physically remove/eject the USB stick...

take ownership of the newly created image file...

sudo chown my-admin Nb50x0-v1.4.x.img

```

sudo chgrp my-admin NB50x0-v1.4.x.img
sudo chmod 440 NB50x0-v1.4.x.img

# does the newly created disk image file appear to contain a valid disk image...
file NB50x0-v1.4.x.img

# list where the partition (usually only one partition within a Symantec Appliance USB boot
stick)...
# ...and note the starting 'block' offset...
# ...and also note that partition type 'b' is type 'vfat' for the mount command...
fdisk -l NB50x0-v1.4.x.img

# re-calculate the 'block offset' of the partition as a 'bytes offset'...
echo "$((512*8064))"
4128768

# create a folder at which to mount the partition...
sudo mkdir /media/image

# and now mount the embedded partition from within the disk image...
sudo mount -o ro,loop,offset=4128768 -t vfat NB50x0-v1.4.x.img /media/image

# copy USB stick contents...
cd /disk2
mkdir NB50x0-v1.4.x
cp -rv /media/image/* ./NB50x0-v1.4.x/

# and unmount the disk image...
sudo umount /media/image
sudo rmdir /media/image

# save a copy of boot binary...
# ...because the next act of creating the type/mode of bootable ISO that we need, will actually
change the contents of a section...
# ...of the primary boot image, i.e. the 'boot.catalog' is written within the isolinux.bin boot
binary for this particular...
# ...type/style/mode/layout of bootable ISO...
cp -v NB50x0-v1.4.x/boot/x86_64/loader/isolinux.bin ./isolinux.bin-NB50x0-v1.4.x
ls -lash

# we're about to create the bootable ISO image, but...
# ...we need to be in the folder because...
# ...the -b switch (aka -eltorito-boot switch) requires that the boot image path spec starts with
"boot/..."

# step in to the folder...
cd NB50x0-v1.4.x

# make the boot image file writable - so that the boot.catalog can be written within it...
chmod u+rw boot/x86_64/loader/isolinux.bin

# make the bootable ISO - this command is all on one line...
genisoimage -r -J -l -no-emul-boot -boot-load-size 4 -boot-info-table -b
boot/x86_64/loader/isolinux.bin -c boot/boot.catalog -o ../NB50x0-v1.4.x.iso ./

# test mounting the new ISO image...
cd ..
sudo mkdir /mnt/iso
sudo mount -o loop -t iso9660 NB50x0-v1.4.x.iso /mnt/iso
du -h /mnt/iso | tail

# unmount the ISO...
sudo umount /mnt/iso
sudo rmdir /mnt/iso

# logoff from Ubuntu...
exit

```

```
# now back on the VM host pull/copy down (from the Ubuntu staging guest) to the VM host a copy of
the newly create bootable ISO...
# ...this next step needs to be actioned on the VM host...
# ...copy iso to VM host...

# if VM host is a Mac...
cd ~
scp myadmin@10.0.9.8:/disk2/NB50x0-v1.4.x.iso NB50x0-v1.4.x.iso

# if VM host is Windows...
cd %userprofile%
pscp myadmin@10.0.9.8:/disk2/NB50x0-v1.4.x.iso NB50x0-v1.4.x.iso
```

3.6 Create Appliance VM Templates

Here we create two empty templates:

- one for NB50x0 PDDO appliance with first disk 400 GB and second disk 1000 GB
- and for NB52x0 master/media appliance with first disk 800 GB and second disk 800 GB

These empty templates can later be used to create further version specific templates, i.e. templates of appliances of specific versions (e.g. NB52x0 v2.5.4 or v2.6.0.1 or etc) which are not yet pre-configured as either master, master/media or media servers.

FYI:

- other, larger, disk sizes may well work.
- during testing, I attempted using different quantities/numbers of disks, but most ended with mixed results, and some installs/builds failed...
- and usually any additional virtual disks were simply left unused, and unable to be used.
- this appears to be quite natural when we consider, in simplistic terms, that in a real physical appliance that there are essentially only two volumes...
 - i.e. the LSI RAID card configuration, within real appliances, presents all of the embedded SATA/SATA drives as:
 - logical disk/volume 1 is a mirror pair (VxVM s/w mirror) of first two physical disks for O/S and application binaries.
 - logical disk/volume 2 through a Veritas disk group (VxDG) of all other physical disks for catalog, MSDP, adv.disk.
- as a guest VM, an NB5220 appears to need the first disk to be > 400 GB.
- a test install failed when using a 400 GB first disk in VirtualBox, whereas when using an 800 GB disk the install was successful.
- note how with VMware VMs we don't need to specify boot order, as the default is HDD then DVD
- whereas with the VirtualBox VMs we explicitly create them with boot order of HDD then DVD.

The steps below are separated in to three sections...

- 1) creating two templates for VMware Fusion on MacOSX
- 2) creating two templates for VMware Workstation on Windows
- 3) creating two templates for Oracle VirtualBox on Windows

FYI - so far, during testing, network bonding has proven to be an issue in guest VM appliances - so no need for 4 virtual NICs just yet...

(...i.e. more testing is required...)

N.B - After creating the templates - do NOT start/poweron the guest yet, as we need to set BIOS date time, which is actioned in subsequent steps.

3.6.1 Create Templates on VMware Fusion on MacOSX

3.6.1.1 Create a Template for NB52x0 Master/Media Server Appliances

```
O/S type: SuSE EL 10.x 64-bit
name:      template-NB52x0
1st disk (for O/S etc) 800 GB, use SCSI as bus/disk type
2nd disk 800 GB, also SCSI
```

```

always use at least 2 NICs
add a SCSI DVD and point it the NB52x0-v9.9.9.iso bootable image.

...and for either/both of the above:
CPU:                1 processor, 2 cores
Memory:             2048 MB
Network:            Use host-only networking
I/O Controller:     LSI Logic (Recommended)
First disk:         SCSI (Recommended), 800 GB.

...add another NIC (host-only network)
...add another 800 GB SCSI HDD

...remove Printer
...remove Sound Card

...options:  Unity:  Untick (i.e. disable)  "Enable Application menu"

```

3.6.1.2 Create a Template for NB50x0 PDDO Appliances

```

O/S type:   SuSE EL 10.x 64-bit
name:       template-NB50x0
1st disk (for O/S etc) 400 GB, use SCSI as bus/disk type
2nd disk 1000 GB, also SCSI
always use at least 2 NICs
add a SCSI DVD and point it the NB50x0-v9.9.9.iso bootable image.
...remove Printer
...remove Sound Card
...options:  Unity:  Untick (i.e. disable)  "Enable Application menu"
...options:  Synchronize time with host

...FYI - differences seen during testing...
VMware Fusion      is ok with 1st disk at 300 GB
VMware WorkStation is ok with 1st disk at 300 GB
Oracle VirtualBox  needs      1st disk at 400 GB
...so may as well just use a 400 GB for 1st disk for all...

```

3.6.2 Create Templates on VMware Workstation on Windows

See above, the steps are essentially the same.

3.6.3 Create Templates on Oracle VirtualBox on Windows

3.6.3.1 Creating a Template for NB52x0 Master/Media Server Appliance

```

vboxmanage createvm --name testNN --ostype Linux26_64 --register

vboxmanage modifyvm testNN --memory 1024 --vram 12
vboxmanage modifyvm testNN --cpus 2 --cpuexecutioncap 50 --pae off --rtcuseutc yes
vboxmanage modifyvm testNN --boot1 disk --boot2 dvd --boot3 none --boot4 none
vboxmanage modifyvm testNN --audio none --usb on --usbhci off --clipboard bidirectional --
draganddrop disabled
vboxmanage modifyvm testNN --nic1 hostonly --nictype1 82540EM
vboxmanage modifyvm testNN --nic2 hostonly --nictype2 82540EM

cd /d %userprofile%
cd "VirtualBox VMs"
cd testNN

vboxmanage createhd --filename disk01 --size 819200 --variant standard
vboxmanage createhd --filename disk02 --size 819200 --variant standard

vboxmanage storagectl testNN --name SCSI --add scsi --controller LsiLogic --hostiocache
off --bootable on
vboxmanage storageattach testNN --storagectl SCSI --type hdd --port 0 --medium disk01.vdi
vboxmanage storageattach testNN --storagectl SCSI --type hdd --port 1 --medium disk02.vdi

```



```
vboxmanage storageattach testNN --storagectl SCSI --type dvddrive --port 8 --medium  
%userprofile%\_testing\NB5220-v2.0.3.iso
```

```
cd ..
```

```
vboxmanage modifyvm testNN --name template-NB52x0
```

3.6.3.2 Creating a Template for NB50x0 - PPDO Appliance

```
vboxmanage createvm --name testNN --ostype Linux26_64 --register
```

```
vboxmanage modifyvm testNN --memory 1024 --vram 12  
vboxmanage modifyvm testNN --cpus 2 --cpuexecutioncap 50 --pae off --rtcuseutc yes  
vboxmanage modifyvm testNN --boot1 disk --boot2 dvd --boot3 none --boot4 none  
vboxmanage modifyvm testNN --audio none --usb on --usbhci off --clipboard bidirectional --  
draganddrop disabled  
vboxmanage modifyvm testNN --nic1 hostonly --nictype1 82540EM  
vboxmanage modifyvm testNN --nic2 hostonly --nictype2 82540EM
```

```
cd /d %userprofile%  
cd "VirtualBox VMs"  
cd testNN
```

```
vboxmanage createhd --filename disk01 --size 409600 --variant standard  
vboxmanage createhd --filename disk02 --size 1048576 --variant standard
```

```
vboxmanage storagectl testNN --name SCSI --add scsi --controller LsiLogic --hostiocache  
off --bootable on  
vboxmanage storageattach testNN --storagectl SCSI --type hdd --port 0 --medium disk01.vdi  
vboxmanage storageattach testNN --storagectl SCSI --type hdd --port 1 --medium disk02.vdi  
vboxmanage storageattach testNN --storagectl SCSI --type dvddrive --port 9 --medium  
%userprofile%\_testing\NB5020-v1.4.2.iso
```

```
cd ..
```

```
vboxmanage modifyvm testNN --name template-NB50x0
```

4 Creating a VM Master Server Appliance

4.1 Copy Template

```
# FYI - The size of a v2.5.2 appliance guest will be (without any data)...
#   ...in VMware Fusion      on MacOSX      36 GB
#   ...in VMware Workstation  on Windows    38 GB
#   ...in Oracle VirtualBox   on Windows    43 GB
```

4.1.1 VMware Fusion on MacOSX

```
Copy 'template-NB52x0' to 'master1'...
...do NOT start the guest yet, we need to control BIOS datetime offset, see below...
```

4.1.2 VMware Workstation on Windows

```
Copy 'template-NB52x0' to 'master1'...
...do NOT start the guest yet, we need to control BIOS datetime offset, see below...
```

4.1.3 Oracle VirtualBox on Windows

```
vboxmanage clonevm template-NB52x0 --name master1 --register
...do NOT start the guest yet, we need to control BIOS datetime offset, see below...
```

4.2 About Expiration Dates of the Temporary Licenses Inside NB52x0 Images

The NB52x0 images contain a built-in temporary license key. Unfortunately, an install of an NB52x0 appliance, be it physical or virtual, will always fail if the current date within the VM is beyond/after the expiration date of the included/embedded license. The only way around this is to set the date within the BIOS of the virtual machine to a point before the temporary license expires. This is fairly easy to do with VM host software.

To set the date in the BIOS of a real physical NB52xx appliance, then this TN explains how to enter the BIOS using <F2>:

<http://www.symantec.com/business/support/index?page=content&id=HOWTO94363>
(...need to explain where the BIOS date is within a physical appliance...)

However, the method of fudging the VM date with the virtual BIOS of a VM guest differs between VMware (Fusion and Workstation) and Oracle VirtualBox.

...with VMware Fusion and Workstation we set the BIOS datetime based on traditional Unix epoch time in seconds.

...with Oracle VirtualBox we set the BIOS datetime as an offset, in milliseconds, from the datetime of the VM host.

Version Build Date	Expiration	Firm Expiration	Use Temporary BIOS Date	NetBackup
----- -----	----- -----	----- -----	----- -----	----- -----
v2.0.1	10-Mar-2012 00:00:00	31-Mar-2012 01:00:00	7-Mar-2012 00:00:00	??
v2.0.2	11-Jan-2013 00:00:00	??	8-Jan-2013 00:00:00	??
v2.0.3	19-Apr-2013 00:00:00	30-Apr-2013 00:00:00	16-Apr-2013 00:00:00	30-Apr-
2012 12:54:52				
v2.5b	13-Mar-2013 00:00:00	31-Mar-2013 00:00:00	10-Mar-2013 00:00:00	9-May-
2012 02:35:22				
v2.5.1b	??	??	??	??
v2.5.2	4-Sep-2013 00:00:00	30-Sep-2013 00:00:00	1-Sep-2013 00:00:00	9-Feb-
2013 23:12:18				
v2.5.3	3-Apr-2014 00:00:00	30-Apr-2014 00:00:00	31-Dec-2013 00:00:00	10-Jun-
2013 21:21:34				
v2.5.4	25-Oct-2014 00:00:00	31-Oct-2014 00:00:00	22-Oct-2014 00:00:00	23-Nov-
2013 21:05:56				
v2.6.0.1	22-Aug-2014 00:00:00	31-Aug-2014 00:00:00	19-Aug-2014 00:00:00	13-Nov-
2013 14:00:02				
v2.6.0.2	25-Mar-2015 00:00:00	31-Mar-2015 00:00:00	22-Mar-2015 00:00:00	24-Apr-
2014 15:28:32				

v2.6.0.3	25-Mar-2015 00:00:00	31-Mar-2015 00:00:00	22-Mar-2015 00:00:00	6-Jul-2014 21:04:49
v2.6.0.4	25-Mar-2015 00:00:00	31-Mar-2015 00:00:00	22-Mar-2015 00:00:00	24-Oct-2014 20:33:48
v2.6.1	25-Mar-2015 00:00:00	31-Mar-2015 00:00:00	22-Mar-2015 00:00:00	27-Oct-2014 22:01:02

Of course, if the current date is less than the 'Expiration' date listed above, then use today's date. You still need to do this, because otherwise installs fail because the virtual appliance doesn't have a date - and so files fail to copy during the install because they are in the future, leading to a corrupt installation.

4.3 Amend BIOS Date Time of Guest

4.3.1 Amend BIOS Date Time of Guest Appliance in VMware Fusion on MacOSX

```
# determine BIOS base/start time in epoch form, i.e. the date time that the guest will start with...
```

```
date -j -f "%Y-%m-%d %H:%M:%S" "YYYY-MM-DD 00:00:00" +%s
1369999999
```

```
# amend vmx file, for first ever boot and install...
```

```
cd ~
cd Documents
cd VMware.Virtual Machines
cd master1
vim master1.VMX
```

```
...and change this line to be "FALSE"...
tools.syncTime = "FALSE"
```

```
...and add these lines...
```

```
time.synchronize.continue = "FALSE"
time.synchronize.restore = "FALSE"
time.synchronize.resume.disk = "FALSE"
time.synchronize.shrink = "FALSE"
time.synchronize.tools.startup = "FALSE"
time.synchronize.tools.enable = "FALSE"
time.synchronize.resume.host = "FALSE"
rtc.startTime = "1369999999" # <<< Remember to change this epoch time to whatever is
required for version being installed.
```

4.3.2 Amend BIOS Date Time of Guest Appliance in VMware Workstation on Windows

```
# determine date time offset for the guest, using a one-line VBScript file...
```

```
notepad time-offset.vbs
WScript.Echo DateDiff( "s", "01-Jan-1970 00:00:00", "DD-MMM-YYYY 00:00:00" )
```

```
...and save and exit, and run it with...
cscript time-offset.vbs
```

```
cd /d "D:\Virtual Machines\master1"
notepad master1.vmx
```

```
...and change this line to be "FALSE"...
tools.syncTime = "FALSE"
```

```
...and add these lines...
```

```
time.synchronize.continue = "FALSE"
time.synchronize.restore = "FALSE"
time.synchronize.resume.disk = "FALSE"
time.synchronize.shrink = "FALSE"
time.synchronize.tools.startup = "FALSE"
time.synchronize.tools.enable = "FALSE"
time.synchronize.resume.host = "FALSE"
rtc.startTime = "1369999999"
```

4.3.3 Amend BIOS Date Time of Guest Appliance in Oracle VirtualBox on Windows

determine date time offset for the guest, using a one-line VBScript file...

notepad time-offset.vbs

```
WScript.Echo 1000 * DateDiff( "s", "DD-MMM-YYYY 00:00:00", Now() )
```

...and save and exit, and run it with...

cscript time-offset.vbs

...set offset from system clock, remember to use the minus '-' below, where NNNNNNNNNNNN is the output from above script...

```
vboxmanage modifyvm master1 --biossystemtimeoffset -NNNNNNNNNNNN
```

4.4 Boot and Install

Depending upon your VM host, this will take anything from 15 to 50 minutes.

4.4.1 Now Boot the Guest VM Appliance to Begin the Installation Process

...this will boot from the ISO image via the CD/DVD drive...

...after a few seconds, a menu will appear, press down arrow to 'Install', and press Enter to select...

...and the installation will continue...

...which will take approximately...

#	VMware Fusion 6	on	Mac OSX 10.9.2 x64	with	SSD	20 mins
#	VMware Workstation 10	on	Windows 2008 R2 x64	with	RAID-5 SATA	35 mins
#	Oracle VirtualBox 4.3	on	Windows 7 Ent x86	with	laptop HDD	50 mins

4.4.2 During Install, to View the Date Time Within Guest

Whilst the boot/install is progressing, it is possible to switch between the different Linux console screens...

...one or more of which may display the date detected from the virtual machine's BIOS...

...BUT - be careful not to enter anything, at least during the install, in any of the alternate consoles...

VMware Fusion Pro 6 on MacOSX:

<fn> <alt> <F7>	# to view term 7 - typically used by appliance for the GUI display
during install...	
<fn> <alt> <F10>	# to view term 10 - typically used by appliance for the console log
of the appliance...	
<fn> <alt> <F1>	# to return to term 1 main console...

VMware Workstation 10 on Windows:

??? keystrokes

Oracle VirtualBox 4.3 on Windows:

<ctrl> <alt> <F7>	# to view term 7 - typically used by appliance for the GUI display
during install...	
<ctrl> <alt> <F10>	# to view term 10 - typically used by appliance for the console log
of the appliance...	
<ctrl> <alt> <F1>	# to return to term 1 main console...

...if you do view any of the other console sessions, then remember to return to the main terminal console number '1'.

4.4.3 Wait For Install To Complete

For NB52x0 master/media appliances, a successful install is fairly obvious...

...the install was probably successful IF you are presented with a login prompt for a username of 'admin'...

...the install probably failed IF you are presented with a login prompt for a username of 'linux-{random}'.

Next steps:

If the install appears to have been successful, then continue below...
If the install appears to have failed, then power off the guest, delete it,...
...and try again from the start of this section (and look for issues, reasons for failure, along the way).

IMPORTANT:

N.B. At this point in time, the NB52x0 appliance appears to have installed ok, but it is still running with a fudged BIOS date.

What we need to do next, is:

- do some basic checks
- install some proper license keys.
- then shutdown the guest appliance.
- then remove the virtual BIOS date spoofing.
- then snapshot or clone - so as to keep a clean base point for this particular version of appliance (to save having to perform another lengthy install).
- then power on/startup again and complete the configuration of the appliance.

4.4.4 Basic Checks

```
# Logon to virtual appliance...
```

```
admin
```

```
P@ssw0rd
```

```
# we need to see: SELF TEST RESULT : [PASS]
```

```
# ...if the self test fails, then consider whether to...
```

```
# ...power-off, delete the VM and try again from the start of this section, looking for issues along the way...
```

```
support
```

```
test software
```

```
return
```

```
# check whether the install appears to have auto-configured storage...
```

```
manage
```

```
storage
```

```
show
```

```
return
```

```
return
```

4.4.4.1 For Appliance v2.6.0.2 Onwards, Disable the Maintenance Lockout

```
...see page 35 of:
```

```
Symantec NetBackup 52xx Appliance Security Guide - Release 2.6.0.2
```

```
http://www.symantec.com/business/support/index?page=content&id=DOC7350
```

```
support / maintenance / elevate
```

```
/opt/Symantec/scspagent/IPS/sisipsoverride.sh
```

4.4.5 Add Licence Key

```
# set a temporary address on eth1, so we can ssh on, as it may be easier to paste in license keys...
```

```
network
```

```
show status
```

```
#configure ip mask gateway ethN
```

```
configure 10.0.9.199 255.255.255.0 10.0.9.1 eth1
```

```
show status
```

```
exit
```

```
# now logon to appliance using ssh or PuTTY to 10.0.9.199...
```

```
admin
```

```
P@ssw0rd
```

```
# ...in v7.6.0.4 we can simply use...
```

```
manage > license > list | add | remove | list
```

```
# ...to manage licence keys...
```

```
# ...but earlier versions of the CLish cause NetBackup application daemons to be restarted each
```

```

time a change to license keys occurs...
# ...hence it may be simpler and quicker to use the following commands...
# add new licences, and remove default temporary shipping license...
support
    maintenance
    P@ssw0rd
    elevate
bpminlicense -list_keys
bpminlicense -delete_keys blah-blah-blah...
bpminlicense -list_keys
bpminlicense -add_keys blah-blah-blah...
bpminlicense -add_keys blah-blah-blah...
bpminlicense -add_keys blah-blah-blah...
bpminlicense -list_keys
exit
    exit
    return

# remove temporary IP address...
network
    unconfigure eth1
    return

# shutdown the virtual appliance...
support
    shutdown
        yes
    exit

# wait for shutdown to complete...

```

4.5 Remove BIOS Date from Appliance

now we remove BIOS date fudge - the method depends upon which VM host you are using...

4.5.1 Remove BIOS Date from Appliance in VMware Fusion on Mac

```

# amend vmx file...
cd ~
cd Documents
cd VMware.Virtual\ Machines
cd master1
vim master1.vmx

...and change this line to be "TRUE"...
tools.syncTime = "TRUE"

...and remove these lines...
time.synchronize.continue = "FALSE"
time.synchronize.restore = "FALSE"
time.synchronize.resume.disk = "FALSE"
time.synchronize.shrink = "FALSE"
time.synchronize.tools.startup = "FALSE"
time.synchronize.tools.enable = "FALSE"
time.synchronize.resume.host = "FALSE"
rtc.startTime = "1369999999"
<esc>:wq!

```

4.5.2 Remove BIOS Date from Appliance in VMware Workstation on Windows

```

# amend vmx file...
cd /d "D:\Virtual Machines\master1"
notepad master1.vmx

...and change this line to be "TRUE"...
tools.syncTime = "TRUE"

```

```
...and remove these lines...
time.synchronize.continue = "FALSE"
time.synchronize.restore = "FALSE"
time.synchronize.resume.disk = "FALSE"
time.synchronize.shrink = "FALSE"
time.synchronize.tools.startup = "FALSE"
time.synchronize.tools.enable = "FALSE"
time.synchronize.resume.host = "FALSE"
rtc.startTime = "1369999999"
...save and exit.
```

4.5.3 Remove BIOS Date from Appliance in Oracle VirtualBox on Windows

```
# remove offset from system clock, by specifying an offset of zero...
vboxmanage modifyvm master1 --biossystemtimeoffset 0
```

4.5.4 If Using VMware Fusion OR Workstation, then Ensure Time Synch is Enabled on Guest VM

```
# ...in VMware, right click the guest...
- Settings
- Advanced
- Synchronize time      No/Yes      # No if NTP is being used, Yes if NTP is not being used...
```

4.6 Shutdown Guest, Take a Snapshot, or Make a Full Clone (if you have the disk space)

```
# ...shutdown the guest VM appliance using the CLISH options

# ...as this will be your base point of a clean install for this particular version of NB52x0
master/media appliance...

# in Oracle VirtualBox - click once on the VM appliance to select it...
# ...and then look to the top right of the Oracle VirtualBox management GUI, and click the
"Snapshots" button/icon...
# ...and click the blue camera icon to take a snapshot...
...Snapshot Name:      base install of NB5220 vN.N.N
...Snapshot Description: licences added, and BIOS date removed.
...click: OK
```

4.7 Initial Configuration of a Guest VM Master Appliance

```
# Now power-on/startup the guest appliance again...
admin
P@ssw0rd

settings      # for v2.0.x the callhome option is not double nested within the CLISH,
but it is for v2.5.x onwards...
  alerts
  callhome show
  callhome disable
  callhome show
  return
  return

# change password for admin CLISH account...
settings1
  password admin
  P@ssw0rd
  <password!admin>
  <password!admin>
  return

# change password of root account...
support
  maintenance
  P@ssw0rd
  elevate
```

```

passwd
<password!root>
<password!root>
exit
exit
return

# add hosts and set appliance name...
network
    show status
    gateway show
...check to make sure that the 192.168.1.1 address has not been lost on eth0, as we can't set the
hostname without this (go figure?)
...and we can't later run the configuration wizard without the appliance having an alternate
address...
...so you may need to...
    show status
    configure 192.168.1.1 255.255.255.0 192.168.1.0 eth0
    show status

# now set what will be our new address on eth1...
    show status
    configure 10.0.9.10 255.255.255.0 10.0.9.1 eth1
    show status

# you will need at least two, one for the VM host (e.g. 10.0.9.1, and one for your master)...
# ...below is just an example of a small lab of ten addresses in the .14x range...
    hosts show
    hosts add 10.0.9.1    vmhost.me.com  vmhost
    hosts add 10.0.9.140  console.me.com console
    hosts add 10.0.9.141  master1.me.com master1
    hosts add 10.0.9.142  master2.me.com master2
    hosts add 10.0.9.143  media1.me.com  media1
    hosts add 10.0.9.144  media2.me.com  media2
    hosts add 10.0.9.145  spa1.me.com    spa1
    hosts add 10.0.9.146  spa2.me.com    spa2
    hosts add 10.0.9.147  client1.me.com client1
    hosts add 10.0.9.148  client2.me.com client2
    hosts add 10.0.9.149  staging.me.com  staging
    hosts show

    hostname show
    hostname set master1.me.com           # this can take over 10 minutes on a slow VM
host...
    hostname show

    return

# check licences have been re-assigned to new hostname, which should have been done by
the 'hostname set' command above...
# ...also check that licences haven't been lost by the setting of the 'hostname', if so, re-add the
dropped keys...
support
    maintenance
    P@ssw0rd
    elevate
    bpminlicense -list_keys
    exit
    exit
    return

# ...if we are using VM host as an NTP server...
# configure NTP...
network
    date show
    timezone set
    <...select your TZ...>
    date show

```



```

ntpserver show
ntpserver add 10.0.9.1
ntpserver show
date show
return

```

```

# logout of CLISH...
exit

```

4.8 Example Configurations

4.8.1 Example Configuration of v2.5.2 Master Appliance

```

*****
* THIS APPLIES TO v2.5.2 ONLY
* -----
* Before starting next section, be aware of what appears to be a bug when trying to configure a v2.5.2 master
* from a freshly installed v2.5.2 image. The issue appears to be that at the very start of the http: GUI
* based configuration wizard loses licence keys, and so when reaching subsequent steps to configure master
* server features the required licence keys are no longer present.
*
* A solution was:
* - before starting step 3.7 below...
* - prepare some 'bpminlicense -add_keys' commands in notepad or textedit, to re-add all of your licences
* - copy these commands in to the paste buffer
* - fire up a ssh/PuTTY session to 'admin@master1' and logon, go to support/maintenance/elevate
* - enter command 'bpminlicense -list_keys'
* - the trick is just after hitting 'OK' for confirm role (in page 5 of 5 below), go back to the ssh/PuTTY
* session and keep up-arrowing and re-entering 'bpminlicense -list_keys' until it works again, and
* shows only one key...
* - then paste in all of the pre-copied 'bpminlicense -add_keys' commands.
* - and the configuration GUI should continue to the end.
*****

```

```

# web browser logon to appliance UI to go through setup just once...
http://10.0.9.10/appliance

```

```

admin
<password!admin>

```

```

click: Setup Appliance

```

```

...page 1 of 5 - Network Configuration...
click Next>

```

```

...page 2 of 5 - Host and System Configuration...

```

```

Host Name:          master1
DNS IP Address(es): 8.8.8.8
DNS Name Suffix:    me.com
Search Domain(s):   me.com
SMTP Server:        127.0.0.1
Email to:           a@b.c.d
click Next>
...configuration occurs...
click Next>

```

```

...page 3 of 5 - Set Time Zone...

```

```

click Next>
...configuration occurs...
click Next>

```

```

...page 4 of 5 - Setup Security...

```

```

click Next>

```

```

...page 5 of 5 - Role Configuration...

```

```

select: Master Server
click Next>
confirm OK

```

...configuration occurs... # this can take up to 15 minutes on a fast VM host,
and 20+ minutes on a slow VM host...

the following is a log of 2.5.2 install via Appliance console...

```
Stopping NetBackup processes
Performing Deduplication Engine cleanup
Creating basic NetBackup configuration on appliance 'master1'
Reconfiguring NetBackup databases
Configuring NetBackup logging on appliance 'master1'
Starting NetBackup processes on appliance 'master1'
Waiting for NetBackup processes to start
Updating CLI views of appliance 'master1'
Updating client install media for appliance 'master1'
!!! >>> !!! FYI - a configuration of a master server from a freshly installed v2.5.2 never
gets beyond this point because
```

licence keys were dropped by one of the early stages during some stage in
the nine lines above.

```
Stopping NetBackup processes
Performing Deduplication Engine cleanup
Creating basic NetBackup configuration on appliance 'master1'
Reconfiguring NetBackup databases
Configuring NetBackup logging on appliance 'master1'
Starting NetBackup processes on appliance 'master1'
Waiting for NetBackup processes to start
Setting 'Catalog' storage partition size to '159.9931640625 GB'...
Starting NetBackup processes... (2 min approx)
Creating 'Deduplication' DiskPool 'dp_disk_master1' and Storage Unit 'stu_disk_master1'...
Creating 'AdvancedDisk' DiskPool 'dp_adv_master1' and Storage Unit 'stu_adv_master1'...
Configuring live update for NetBackup clients
Setting NetBackup retention levels for backup images
Configuring NetBackup tape media settings
Configuring tape libraries of appliance 'master1', if any
Updating CLI views of appliance 'master1'
Updating client install media for appliance 'master1'
Exporting NFS share master1:/inst/client for UNIX based NetBackup client installation.
Exporting CIFS share \\master1\client for Windows based NetBackup client installation.
Initial configuration of the NetBackup appliance is complete.
Appliance 'master1' has been configured as master appliance.
Deduplication storage unit 'stu_disk_master1' is ready for use as storage destination.
Setup Complete.
Running Sanity tests on Master Appliance.
```

```
Checking if installation is successful ... [OK]
Checking if SSH is enabled ... [OK]
Checking if hostname is set ... [OK]
Checking if IP address is set ... [OK]
Checking if appliance user accounts exists ... [OK]
Checking if required packages are installed ... [OK]
Checking if NetBackup is configured and running ... [OK]
Checking if storage units and diskpools have been created ... [OK]
Checking if SLPs have been created ... [NA]
Checking if required NetBackup policies have been created ... [NA]
Checking if Web Server is configured and running ... [OK]
Checking test backup and restore operations ... [OK]
Expiring test backup images and deleting test policy ... [OK]
Checking critical kernel drivers exists and can work ... [NA]
```

```
Completed running tests on the appliance.
SELF TEST RESULT : [PASS]
```

...wait for five minutes, as suggested...

```
# ...then click the 'Click here to reconnect to the appliance after five minutes.'
# ...logon to web admin UI as user 'admin'...
# ...and note how the web admin UI is now a management UI...
# ...and note how, for virtual appliances, the Monitor / Summary page is unable to check hardware
```

```
status (of course)...\n# ...but you can view the current storage configuration via the 'Manage / Storage' screen...\n    http://10.0.9.10/appliance\n# ...logout of web admin UI.
```

4.8.2 Example Configuration of v2.6.0.4 Master Appliance

```
# The v2.6.0.4 process can take a long time in page 2 of 9 (Host Configuration), if there are many\nhosts files entries...
```

```
#...and the following is the log of configurations from the Appliance Web GUI interface...
```

```
- [Info] FQDN name is 'master1.me.com'\n- [Info] Validating the hostname 'master1.me.com'\n- [Info] Gathering license information\n- [Info] Stopping NetBackup processes.\n- [Info] Removing current NetBackup configuration.\n- [Info] Performing Deduplication Engine cleanup.\n- [Info] Hostname set to 'master1'.\n- [Info] Re-initializing NetBackup with the new host name\n- [Info] Creating basic NetBackup configuration on appliance 'master1'\n- [Info] Reconfiguring NetBackup databases\n- [Info] Configuring NetBackup logging on appliance 'master1'\n- [Info] Starting NetBackup processes on appliance 'master1'\n- [Info] Waiting for NetBackup processes to start\n- [Info] Updating CLI views of appliance 'master1'\n- [Info] Updating client install media for appliance 'master1'\n- [Info] Operation completed successfully.\n- [Info] Checking current state of the appliance\n- [Info] Initializing storage configuration...\n- [Info] Acquired lock on the storage.\n- [Info] Looking for existing storage configurations...\n- [Warning] Failed to query SCSI device '/dev/system/root'.\n- [Info] No existing storage configurations found.\n- [Info] Looking for existing storage configurations...\n- [Warning] Failed to query SCSI device '/dev/system/root'.\n- [Info] Creating a new storage configuration now...\n- [Info] Storage partitions are not present.\n- [Info] 'Configuration' storage partition does not exist. Creating it now...\n- [Info] The estimated time to create the 'Configuration' partition can range from 0 hours, 2\nminutes to 0 hours, 5 minutes depending on the system load. The greater the system load the longer\nit takes to complete the resize operation.\n- [Info] Creating the 'Configuration' partition '0'...\n- [Info] Mounting the 'Configuration' partition '0'...\n- [Warning] Failed to query SCSI device '/dev/system/root'.\n- [Info] 'Catalog' storage partition does not exist. Creating it now...\n- [Info] The estimated time to create the 'Catalog' partition can range from 0 hours, 2 minutes to\n0 hours, 5 minutes depending on the system load. The greater the system load the longer it takes to\ncomplete the resize operation.\n- [Info] Creating the 'Catalog' partition '0'...\n- [Info] Mounting the 'Catalog' partition '0'...\n- [Info] Moving appliance configuration database to the Configuration partition.\n- [Info] Updating hostname in the NetBackup Authentication Service configuration.\n- [Info] Removing existing NetBackup configuration on appliance 'master1'\n- [Info] Stopping NetBackup processes.\n- [Info] Removing current NetBackup configuration.\n- [Info] Performing Deduplication Engine cleanup.\n- [Info] Configuring appliance 'master1' as NetBackup master appliance\n- [Info] Creating basic NetBackup configuration on appliance 'master1'\n- [Info] Reconfiguring NetBackup databases\n- [Info] Configuring NetBackup logging on appliance 'master1'\n- [Info] Starting NetBackup processes on appliance 'master1'\n- [Info] Waiting for NetBackup processes to start\n- [Info] Configuring storage partitions for appliance 'master1'\n- [Warning] Failed to query SCSI device '/dev/system/root'.\n- [Info] Stopping NetBackup processes... (6 min approx)\n- [Info] Starting NetBackup processes... (6 min approx)\n- [Info] Setting the 'Catalog' storage partition size to '10 GB'...
```

```

- [Warning] Failed to query SCSI device '/dev/system/root'.
- [Info] The estimated time to resize the 'Catalog' partition can range from 0 hours, 2 minutes to 0 hours, 18 minutes depending on the system load. The greater the system load the longer it takes to complete the resize operation.
- [Info] Expanding the 'Catalog' partition '0'...
- [Info] Setting the 'MSDP' storage partition size to '684 GB'...
- [Info] 'MSDP' storage partition does not exist. Creating it now...
- [Info] The estimated time to create the 'MSDP' partition can range from 0 hours, 2 minutes to 0 hours, 5 minutes depending on the system load. The greater the system load the longer it takes to complete the resize operation.
- [Info] Creating the 'MSDP' partition '0'...
- [Info] Mounting the 'MSDP' partition '0'...
- [Warning] Failed to query SCSI device '/dev/system/root'.
- [Info] Setting the 'AdvancedDisk' storage partition size to '100 GB'...
- [Info] 'AdvancedDisk' storage partition does not exist. Creating it now...
- [Info] The estimated time to create the 'AdvancedDisk' partition can range from 0 hours, 2 minutes to 0 hours, 11 minutes depending on the system load. The greater the system load the longer it takes to complete the resize operation.
- [Info] Creating the 'AdvancedDisk' partition '0'...
- [Info] Mounting the 'AdvancedDisk' partition '0'...
- [Info] Creating the 'AdvancedDisk' partition '1'...
- [Info] Mounting the 'AdvancedDisk' partition '1'...
- [Info] Creating the 'AdvancedDisk' partition '2'...
- [Info] Mounting the 'AdvancedDisk' partition '2'...
- [Info] Creating the 'AdvancedDisk' partition '3'...
- [Info] Mounting the 'AdvancedDisk' partition '3'...
- [Info] Creating 'MSDP' DiskPool 'dp_disk_master1' and Storage Unit 'stu_disk_master1'...
- [Info] Creating 'AdvancedDisk' DiskPool 'dp_adv_master1' and Storage Unit 'stu_adv_master1'...
- [Info] Configuring live update for NetBackup clients
- [Info] Setting NetBackup retention levels for backup images
- [Info] Configuring NetBackup tape media settings
- [Info] Configuring tape libraries of appliance 'master1', if any
- [Info] No tape library found on appliance 'master1'.
- [Info] Updating CLI views of appliance 'master1'
- [Info] Updating client install media for appliance 'master1'
- [Info] Starting up NetBackup Web Service Layer
- [Info] Exporting NFS share master1:/inst/client for UNIX based NetBackup client installation.
- [Info] Exporting CIFS share \\master1\install for Windows based NetBackup client installation.
- [Info] Initial configuration of the NetBackup appliance is complete.
- [Info] Appliance 'master1' has been configured as master appliance.

- [Info] Note: You must add the appropriate storage option software license keys on the master server to use the AdvancedDisk and the Deduplication disk pool.

```

Running Validation tests on Master Appliance master1.

```

Checking whether serial number is present ... [OK]
Checking whether installation is successful ... [OK]
Checking whether critical kernel drivers exist and can work ... [NA]
Checking whether SSH is enabled ... [OK]
Checking whether hostname is set ... [OK]
Checking whether IP address is set ... [OK]
Checking whether appliance user accounts exist ... [OK]
Checking whether required packages are installed ... [OK]
Checking whether BIOS firmware is compatible with the software ... [NA]
Checking whether registration information is properly set ... [NA]
Checking whether NetBackup is configured and running ... [OK]
Checking whether storage units and diskpools have been created ... [OK]
Checking whether Web Server is configured and running ... [OK]
Checking test backup and restore operations ... [OK]
Expiring test backup images and deleting test policy ... [OK]

```

Completed running tests on the appliance.

```
SELF TEST RESULT : [PASS]
```

4.9 Notes Re Other Versions of NB52x0 Appliances

As yet, whilst I have found that it is possible to install v2.6.1 on an NB52x0 template, I have not been able to configure it as either a master, master/media or media server.

The only way that I have been able to create a workign v2.6.1 master server was to:

- Build a fresh v2.6.0.3 master appliance
- Apply networking, and hosts entries, set hostname, add a license
- Configure as master server
- Then apply the v2.6.1 update.

4.10 Post Configuration Actions

```
# ...older versions of the install/configure will have re-enabled call home...
```

```
# ...log back in to CLISH, via ssh or PuTTY...
```

```
admin
```

```
<password!admin>
```

```
appliance
  status
  return
```

```
manage
  license
  listinfo
  return
  return
```

```
settings
  callhome show
  callhome disable
  callhome show
  return
  return
```

```
settings
  netbackup additionalservers add console.me.com
  netbackup additionalservers add vmhost.me.com
  netbackup additionalservers add medial.me.com
  return
```

```
# ...and remove the 192.168.1.1 address on eth0...
```

```
network
  show status
  gateway show
  unconfigure eth0
  show status
  gateway show
  return
```

```
# ...remind yourself of storage capacities...
```

```
manage
  storage
  show
  return
  return
```

```
exit
```

```
# ...you should now have a working virtual NB52x0 Appliance based Master Server...
```

```
# ...however, you may want to consider the following further actions...
```

4.10.1 Specific Steps to Take for v2.6.0.x Master/Media and Media Servers

```
# ...check MSDP retry settings:
```

```
Support > Maintenance > elevate
```

```

/usr/opensv/pdde/pdag/bin/pdcfg --read /disk/etc/puredisk/agent.cfg --section contentrouter
--option MaxRetryCount
/usr/opensv/pdde/pdag/bin/pdcfg --read /disk/etc/puredisk/contentrouter.cfg --section ContentRouter
--option MaxRetryCount

# ...and if the values are 5 and 3, then you need to update them to:
/usr/opensv/pdde/pdag/bin/pdcfg --write /disk/etc/puredisk/agent.cfg --section contentrouter
--option MaxRetryCount --value 50
/usr/opensv/pdde/pdag/bin/pdcfg --write /disk/etc/puredisk/contentrouter.cfg --section ContentRouter
--option MaxRetryCount --value 30

```

4.11 Post Build Actions

4.11.1 Shutdown the Appliance, Take a Snapshot (or Clone), and Reboot

4.11.2 Configure an Admin Console ? (see section below)

4.11.3 Configure Your Catalog Backup Policy

...to save to Adv. Disk, and run first catalog backup.

4.11.4 Enable BMR on the Master Server Appliance (see BMR section below)

4.11.5 Add Windows Client Package to Virtual Master and/or Media Server Appliance

```

# ...to copy from Windows...
Manage > Software > Share Open
The CIFS share \\master1\incoming_patches
and the NFS share master1:/inst/patch/incoming have been opened on this appliance.

REM net use Z: \\master1\incoming /user:admin password!admin
net use X: \\master1\incoming_patches /user:admin password!admin
copy SYMC_NBAPP_addon_nbwin-7.6.0.4-SLES11.x86_64.rpm X:\
net use Z: /delete

# ...to copy from MacOSX...
Manage > Software > Share Open
The CIFS share \\master1\incoming_patches
and the NFS share master1:/inst/patch/incoming have been opened on this appliance.

sudo mkdir /mnt
sudo mkdir /mnt/master1
sudo mount_nfs -o resvport 10.0.9.141:/inst/patch/incoming /mnt/master1
cp -v SYMC_NBAPP_addon_nbwin-7.6.0.4-SLES11.x86_64.rpm /mnt/master1
sudo umount /mnt/master1
sudo rmdir /mnt/master1

# ...loading/installing...
Manage > Software > Share Close
Manage > Software > List Downloaded
Validating update 'SYMC_NBAPP_addon_nbwin-7.6.0.4-SLES11.x86_64.rpm' ...ok
Validating update '.SYMC_NBAPP_addon_nbwin-7.6.0.4-SLES11.x86_64.rpm' ...failed
- [Error] Update .SYMC_NBAPP_addon_nbwin-7.6.0.4-SLES11.x86_64.rpm has an invalid name.
Software updates downloaded:
Patch_Name          Size  Release_Date      NBU_Version
SYMC_NBAPP_addon_nbwin-7.6.0.4-SLES11.x86_64.rpm  1.5G  Mon Oct 27 2014   7.6.0.4

master1.Software> Install SYMC_NBAPP_addon_nbwin-7.6.0.4-SLES11.x86_64.rpm
Do you want to proceed with the installation of this addon?(yes/no)yes
Acquiring appliance exclusive lock ...ok
Checking the add-on 'SYMC_NBAPP_addon_nbwin-7.6.0.4-SLES11.x86_64.rpm' ...ok

```

```
Checking whether the add-on is already installed ...      no
Proceeding to install the update ...                    ok
- [Warning] No recipients are configured to receive software notifications.
  Use 'Settings->Alerts->Email Software Add' command to configure the appropriate Email
address.
- [Info] Successfully installed the add-on SYMC_NBAPP_addon_nbwin-7.6.0.4-SLES11.x86_64.rpm.
master1.Software>
```

4.11.6 Install a Client Using a Kit from the Appliance

Logon to a client.
Start web browser to the appliance.
Download the client kit from the web-admin UI of the appliance.
Install the client.

4.11.7 Configure a Test Backup Policy

...to save to MSDP de-dupe storage, and run first client backup.

5 Build a VM Media Server Appliance

5.1 Initial Steps

...the process is the same as above (for a master server) but:

- use a different IP address, e.g. 10.0.9.11
- use a different name, e.g. medial.me.com
- in the final screen of web based appliance configuration choose "media", to add this appliance media server to an appliance master server.

5.2 Add Media Server Appliance to Master Server Appliance

N.B. Be careful here, the method used to add a media server appliance to a NetBackup Master Server depends upon whether the master server is a traditional server/cluster or whether it is itself also an appliance...

When adding an appliance as a media server to a master then there are only these options...

If the master server is a **v2.0.3** appliance...
...then to add a media server appliance...
...**on master server:** Main > Appliance > Add media-name media-admin-password

If the master server is a **v2.5.x** and above appliance...
...then to add a media server appliance...
...**on media server:** Main > Appliance > media master-name

If the master server is a classic/normal/traditional server (i.e. not an appliance)...
...then to add a media server appliance...
...**on media server:** Main > Appliance > media master-name

If the master server is an appliance...
...then to add a traditional media server...
...**in NetBackup Admin Console:** Add media server.

In a test, adding an appliance media server to an appliance master server took about 15 minutes, with an environment that had just two clients (in my test (results below), one client was unreachable - which delayed things a bit)...

```
master1.Appliance> Add medial.me.com <password!admin> # the password is the
password of 'admin' on the appliance media server...
...capture output...
```

5.3 Log from Adding a New (not Upgraded) v2.5.2 NB5220 Media Server to a Master (via Appliance UI)

```
-----
Checking the pre-requisites .....
Validating master server name 'master1.me.com'
Comms check (bptestbpcd) ..... :[OK]
Name lookup check ..... :[OK]
Firewall/Port check ..... :[OK]
Restarting NetBackup services ... :[OK]
Master access check ..... :[OK]
Version compatibility check ..... :[OK]
*** Using master1.me.com as master server
-----
INFO: Adding the following servers to the NetBackup configuration
SERVER=master1.me.com
-----
Stopping NetBackup processes
Performing Deduplication Engine cleanup
Configuring media server on the appliance ...
Restarting NetBackup daemons on the local host.
Creating media server storage partitions and storage units ...
```



```
Configuring storage pool:  
Checking AdvanceDisk Licenses...  
Checking Deduplication Licenses...  
Creating storage partitions and storage units ...  
Starting NetBackup processes... (2 min approx)  
Creating 'Deduplication' DiskPool 'dp_disk_medial' and Storage Unit 'stu_disk_medial'...
```

6 Create a VM NB50x0 PDDO Appliance

6.1 About NB5000/NB5020/NB5030 Default Addresses, Accounts, Passwords

First some points to note:

- There are several (five or six or seven - depending upon your point of view) different ways to logon to a PDDO appliance...
- As the versions have evolved, the default password of the sysadmin and root accounts has changed...
- As the versions have evolved, the default IP address of eth0 has changed...
- ...so, the password, and the address, that you need to know for first logon depends upon the version installed...

N.B. For a newly installed NB50x0 appliance it is possible to describe seven different ways to initially connect...

IMPORTANT: Whilst some of the different methods have a username of 'root', it should be noted that each 'root'...

...is most definitely not the same 'root' account...

...we will learn more about the functionally different 'root' accounts later...

Method	Username	Default Password	Lands At
-----	-----	-----	-----
1) at the console	sysadmin	(see below)	CLISH
2) at the console	root	(see below)	CLISH
3) ssh to address on eth0	sysadmin	(see below)	CLISH
4) ssh to address on eth0	root	(see below)	CLISH
5) web browser to address on IPMI	root	P@ssw0rd	System console
6) web browser to address on eth0/Installer	root	P@ssw0rd	Installer UI
7) web browser to address on eth0	root	P@ssw0rd	Web Admin UI

FYI - Over the different versions; the observed, or documented, defaults have been:

Account/Port	Password/Address
-----	-----
NB50x0 v1.2	
sysadmin	sysadmin
root	root
ipmi	?..?..?
eth0	?..?..?
NB50x0 v1.3.0.1	
sysadmin	P@ssw0rd
root	P@ssw0rd
ipmi	?..?..?
eth0	?..?..?
NB50x0 v1.4.0R1	
sysadmin	P@ssw0rd
root	P@ssw0rd
ipmi	192.168.0.1
eth0	192.168.1.1
NB50x0 v1.4.2	
sysadmin	P@ssw0rd
root	P@ssw0rd
ipmi	192.168.0.1
eth0	192.168.1.1
NB50x0 v1.4.3	
sysadmin	P@ssw0rd
root	P@ssw0rd
ipmi	?..?..?
eth0	?..?..?
NB50x0 v1.4.4	
sysadmin	P@ssw0rd

```
root          P@ssw0rd
ipmi          ?..?..?
eth0          169.254.1.1
```

6.2 Clone the PDDO Template

6.2.1 VMware Fusion on MacOSX

Copy 'template-NB50x0' to 'spa1'...

6.2.2 VMware Workstation on Windows

Copy 'template-NB50x0' to 'spa1'...

6.2.3 Oracle VirtualBox on Windows

```
vboxmanage clonevm template-NB50x0 --name spa1 --register
```

6.2.4 Associate Boot ISO to Guest VM

Use GUI to attached which ever version of NB50x0 boot ISO you want to use.

...and then boot the appliance...

...wait for initial yellow console to load, and then down arrow to select install, and press return...

6.2.5 Install Occurs

takes about 15 mins in	VMware Fusion Pro 6.0.2	on Mac OSX 10.9.2	with SSD
takes about 20 mins in	VMware Workstation 10	on good Windows 2008 R2 SP1	with RAID-5
SATA			
takes about 50 mins in	VirtualBox 4.3	on a standard Windows 7 Ent laptop	with spinning
rust			

N.B. Halfway through this first install/build you will be prompted for a licence, which needs to be at least one of:

```
"SYMC NETBACKUP DEDUPLICATION OPTION 7.x ... FRONT END TBYTE STD LIC ..."
```

...then let the build/install/auto-base-config run to completion...

...at the end of which you will see a logon prompt...

6.2.6 Wait For Install To Complete

For NB50x0 PDDO appliances, a successful install is fairly obvious...

...the install was probably successful IF you are presented with a login prompt for a username of 'sysadmin:'

...the install probably failed IF you are presented with a login prompt for a username of 'linux-{random}'

Next steps:

If the install appears to have been successful, then continue below...

If the install appears to have failed, then power off the guest, delete it, and try again from the start of this section (and look for issues along the way).

6.2.7 Take a Snapshot ? Or Clone ?

```
# now that we have a freshly installed appliance - you may want to take a snapshot...
```

```
# ...or even fully clone this particular version, which is probably a good idea for several reasons...
```

```
# ...you will have a known good point, without having to re-install...
```

```
# ...you will be able to easily clone the snapshot, or clone the clone itself, to create new appliances...
```

```
# ...if so...
```

```
# ...then logon to the appliance...
```

```

sysadmin
P@ssw0rd
system
poweroff node 192.168.1.1
exit
logout

# ...and wait for the guest VM appliance to shutdown...
# ...next, use the VM host software to snapshot or clone this appliance, if cloning then
perhaps name the copy as: clone-NB50x0-v9.9.9

# ...after snapshot, or cloning, power-on/start-up the guest VM appliance again...

```

6.3 Basic Configuration

6.3.1 Pre Checks

```

# login at console within VM host software...
sysadmin
P@ssw0rd

# check whether the install appears to been successful...
storage
    volume getStorageStatus
    vxprint shownode
    exit

# disable callhome...
system
    callhome show
    callhome disable
    callhome show
    exit

```

6.3.2 Change Passwords

```

admin
    password
    <password!sysadmin>
    <password!sysadmin>
    su
    passwd
    <password!root>
    <password!root>
    exit
    exit

```

6.3.3 Basic Steps to Pre-Configure in Readiness for GUI Based Configuration

```

# these four sub-steps MUST be done in this order, because...
# ...working backwards...
# ...can't setnodeip without the address having been assigned to a (virtual) NIC...
# ...can't set (virtual) NIC address without a hosts file entry...
network
    hostname show
    hostname change 192.168.1.1 spa1
    hostname show

    hosts show
    hosts del 192.168.1.1
    hosts show
    hosts add 10.0.9.1 vmhost.me.com vmhost
    hosts add 10.0.9.8 staging.me.com staging
    hosts add 10.0.9.9 console.me.com console
    hosts add 10.0.9.10 master1.me.com master1

```

```

hosts add 10.0.9.11 media1.me.com media1
hosts add 10.0.9.12 spa1.me.com spa1
hosts show

config show
config addr 192.168.1.1 eth1 10.0.9.12 255.255.255.0
config show

setnodeip 10.0.9.12
exit

```

6.3.4 Configure NTP ?

```

# setting an NTP server address is optional in this VM lab - if you can't/don't configure NTP, then
in later steps we will ensure that VM host software maintains guest VM datetime...
# ...but it is very strongly recommended to have an NTP server for real appliances because PDDO
uses timestamps extensively within its own database...
# ...and strange things (data corruption?) can occur when time drifts on/in PDDO appliances - you
have been warned ;)
system
    clock showtime
    ntp show
    ntp set 10.0.9.1          # Did this prompt for /Installer root password, or SPA root password
?
    ntp show
    clock showtime
    exit

logout

```

6.3.5 GUI Based Configuration of NB50x0 PDDO Appliance

```

# open browser to the 'Installer UI' at...
https://10.0.9.12/Installer
root
P@ssw0rd

...click: Change configuration wizard password
...change the password...
    <password!installer>
    <password!installer>
...click logout, and log back in...

...click: Start the network configuration wizard
Network Interface:      eth1
IP Address:             10.0.9.12
Set as Node IP Address: Yes
Netmask:                255.255.255.0          (...but you may require 255.255.0.0 for a /16
network...)
Default Gateway:        10.0.9.1
Name Servers:           8.8.8.8               (...to fudge the config within a guest VM - but in the
real world, a valid working DNS server is highly recommended...)
Search Domains:         me.com                (...again just to fudge a VM based installed, this is
a requirement for real appliances...)
<click Next to perform the updates>          (...takes about 3 minutes...)

# The following is for a v1.4.2 NB5020...
...FYI - there are 9 of 9 stages with v1.4.4)...

...click: Start the storage pool configuration wizard
Step 1 of 6 - Topology Discovery...
...in: Node in Storage Pool
select the serial number and enter an FQDN
poola1.me.com
<select: Activate added CR node automatically>
<click Next>

```

```

Step 2 of 6 - Network Reconfiguration...
...wait for this step to complete...
<click Next>

Step 3 of 6 - Licenses...
<click Next>

Step 4 of 6 - Storage Pool Details...
!! N.B. Remember to make a note of the SPA ID, and SPA name, and store it somewhere safe...
Name:      spa1.me.com
           my-desc
           my-loc
           my-dept
           <select: This is the Central Storage Pool Authority (SPA)
           <password!spa>
           <password!spa>
           <empty ntp>
           Europe/London
           127.0.0.1
           me
<click Next>

Step 5 of 6 - Summary...
<click Next>
...takes about 10 minutes to implement configuration...

Step 6 of 6 - Implementation...
...wait 5 minutes for wizard to complete...

```

6.3.6 Post Configuration Actions

```

# login at console (or ssh) and check storage node IP and name...
sysadmin
<password!sysadmin>
nodeinfo

# now remove the old 192.168.1.1 address from eth0...
network
route show
config show
unconfig addr 10.0.9.12 eth0
config show
route show
exit
logout

# logon to web admin UI (not the /Installer UI), and clear alerts...
http://10.0.9.12/
<password!spa>

# You should now have a working NB50x0 PDDO VM appliance that is ready to be configured and used.

```

6.4 Adding NB50x0 PDDO As Storage To NetBackup

(to be completed)

6.4.1 Build a Second PDDO Node to Join as a CR to the SPA ?

(to be completed)

6.4.2 Configuring SPA As Storage For A Media Server

(to be completed)

7 Admin Console and OpsCenter Server on Windows 2008 R2 SP1

FYI - During my testing, I was able to install both the Windows native and the Windows Java NetBackup Admin Console, both at v7.1.0.4 - quite happily alongside OpsCenter Server v7.5.0.7. i.e. the Admin Console does not need to be at the same version as OpsCenter Server - they are two distinct, and separate, applications that have no co-requirements.

7.1 Initial Steps

```
# create a guest VM...
    - remember to add two NICs - one for host LAN (e.g. 10.0.1.x), and one for private lab LAN (10.0.9.x)...
```

```
# boot, and install O/S...
```

```
# patch the O/S up to date...
```

```
# change name of server to 'console'...
```

```
# add hosts file entries (as shown earlier)...
```

```
# change IP of NIC2 to 10.0.9.9
```

```
# rename the NIC for the 10.0.1.x network to LAN
# rename the NIC for the 10.0.9.x network to NBU
# change the location of the LAN network to Public
# change the location of the NBU network to Work/Private
# disable Windows firewall for 'Private' networks
# ...if you can't do the location changes above then you may need to execute the next step, to allow changes - and then retry...
```

7.2 Amend Behaviour of Windows Network Location Awareness (NLA)

```
Start -> Run -> gpedit.msc
    Local Computer Policy
        Computer Configuration
            Windows Settings
                Security Settings
                    Network List Manager Policies
                        Unidentified Networks      Not configured      + User can change location
                        Identifying Networks        Not configured
                        All Networks                User can change name + User can change
location + User can change icon
                LAN      Network Name      LAN      + User can change name
                Icon      Icon      + User can change icon
                Location  Private  + User can change location
```

```
Start -> Run -> gpupdate /force
```

```
Start -> Run -> intl.cpl
    ...and set language, keyboard, system locale.
```

```
# reboot...
shutdown /r /t 1
```

7.3 FireWall Rules For Windows 2008 R2 SP1

Questions:

- When GPO based firewall rules are in place - how to view/list ?
- How does one list which profile (domain, private, public) applies to any given NIC ?

7.3.1 Web Resources

...command syntax:

<http://technet.microsoft.com/en-us/library/dd734783%28v=ws.10%29.aspx>

...some useful notes:

<http://technet.microsoft.com/en-us/library/cc947815%28v=ws.10%29.aspx>

7.3.2 Some Notes

Syntax	Can Use?	Supported On
-----	-----	-----
netsh firewall	deprecated	Windows 2003, XP
netsh advfirewall	supported	Windows 2012 &R2, 2008 &R2, 8 &.1, 7, Vista

7.3.3 Some Show Commands

...show which profiles are active:

```
netsh advfirewall show allprofiles | findstr /i "settings state"
```

...check whether logging has been enabled, and to separate logs:

```
netsh advfirewall show allprofiles
```

...show all rule names:

```
netsh advfirewall firewall show rule name=all | find "Rule Name:" | more
```

...look for anything NetBackup related:

```
netsh advfirewall firewall show rule name=all | findstr /i "nb netb sym veri bpcd vnetd pbx 1556  
13720 13724 13782"
```

...to list all rules:

```
netsh advfirewall firewall show rule name=all verbose > rules-all.txt  
netsh advfirewall firewall show rule name=all direction=in verbose > rules-in.txt  
netsh advfirewall firewall show rule name=all direction=out verbose > rules-out.txt
```

...do any rules use "bypass" feature?

```
netsh advfirewall firewall show rule name=all verbose | find /i "bypass"
```

...are there any in-bound rules that are enabled ?

```
netsh advfirewall firewall show rule name=all direction=in | find "Enabled:" | find "Yes"
```

7.3.4 Configure Firewall Logging

...setup separate logs, and enable logging of dropped connections...

...quick look in the default Windows firewall logging area...

```
dir %systemroot%\system32\LogFiles\Firewall\
```

...perhaps place the logs somewhere easily accessible...

```
mkdir C:\FIREWALL-LOG
```

```
netsh advfirewall set domainprofile logging filename C:\FIREWALL-LOG\firewall-domain.log
```

```
netsh advfirewall set privateprofile logging filename C:\FIREWALL-LOG\firewall-private.log
```

```
netsh advfirewall set publicprofile logging filename C:\FIREWALL-LOG\firewall-public.log
```

...or, for typical folder...

```
netsh advfirewall set domainprofile logging  
filename %systemroot%\system32\LogFiles\Firewall\firewall-domain.log  
netsh advfirewall set privateprofile logging  
filename %systemroot%\system32\LogFiles\Firewall\firewall-private.log  
netsh advfirewall set publicprofile logging  
filename %systemroot%\system32\LogFiles\Firewall\firewall-public.log
```

...set the max log size...

```
netsh advfirewall set domainprofile logging maxfilesize 32767
```

```
netsh advfirewall set privateprofile logging maxfilesize 32767
```

```
netsh advfirewall set publicprofile logging maxfilesize 32767
```

...log dropped connections...

```
netsh advfirewall set domainprofile logging droppedconnections enable
```

```
netsh advfirewall set privateprofile logging droppedconnections enable
```

```
netsh advfirewall set publicprofile logging droppedconnections enable
```



```
dir C:\FIREWALL-LOG
```

```
netsh advfirewall show allprofiles
```

7.3.5 If You Want To Capture To The Windows Event Logs

...don't do this yet, but if you want to (also) log to the Windows event logs...

...see Filtering Platform Packet Drop...

<http://msdn.microsoft.com/en-us/library/bb309058.aspx>

```
REM auditpol /set /subcategory:"{0CCE9225-69AE-11D9-BED3-505054503030}" /failure:enable
```

7.3.6 If You Want To Log The Allowed Connections Too

...de-REM these if you want to...

```
REM netsh advfirewall set domainprofile logging allowedconnections enable
```

```
REM netsh advfirewall set privateprofile logging allowedconnections enable
```

```
REM netsh advfirewall set publicprofile logging allowedconnections enable
```

7.3.7 From The Port Guide Manual for v7.6

>>> *** THIS WHOLE SECTION IS INCOMPLETE <<< ***

Work to be done... perhaps three sets of definitions could be recorded here:

- 1) a loose set that allows any program all classic NetBackup ports in from any address.
- 2) a firmer set that allows any program all classic NetBackup ports in from specific sub-nets.
- 3) a tight set that allows specific programs specific NetBackup port in AND out to specific sub-nets.

Below, all ports are TCP unless otherwise stated.

...ports listed below do not include: VxSS, NetWare, pre v7.0.1, resilient client.

Client - v7.0.1 through v7.6.0.x

```
-----
nbu-out-pbx          dir=out  localport=1556  "C:\Program Files
(x86)\VERITAS\VxPBX\bin\pbx_exchange.exe"
nbu-in-pbx           dir=in   localport=1556  "C:\Program Files
(x86)\VERITAS\VxPBX\bin\pbx_exchange.exe"
```

Client - side de-duplication

```
-----
nbu-out-bpbkar-spada dir=out  localport=10102 "bpbkar? to spada"
nbu-out-bpbkar-spoold dir=out  localport=10082 "bpbkar? to spoold on MSDP and/or PureDisk
SPA"
nbu-out-bpbkar-spa    dir=out  localport=443   "bpbkar? to PureDisk SPA"
```

Client - side GRT

```
nbu-out-?-portmapper dir=out  localport=111   "? to portmapper on media server"
nbu-out-?-nbfspd      dir=out  localport=3794  "? to nbfspd      on media server"
```

Admin Console (Windows and/or Java)

```
-----
nbu-out-pbx          dir=out  localport=1556  "C:\Program Files
(x86)\VERITAS\VxPBX\bin\pbx_exchange.exe"
nbu-out-vnetd        dir=out  localport=13724  "C:\Program
Files\Veritas\NetBackup\bin\vnetd.exe"
nbu-in-pbx           dir=in   localport=1556  "C:\Program Files
(x86)\VERITAS\VxPBX\bin\pbx_exchange.exe"
nbconsole.exe?
java.exe?
```

```

Media Server
-----
nbu-out-pbx      dir=out  localport=1556  "C:\Program Files
(x86)\VERITAS\VxPBX\bin\pbx_exchange.exe"
nbu-out-?-spad   dir=out  localport=10102  "? to spad"
nbu-out-?-spool  dir=out  localport=10082  "? to spool on MSDP and/or PureDisk SPA"
nbu-out-?-spa    dir=out  localport=443    "? to PureDisk SPA"
nbu-in-pbx       dir=in   localport=1556  "C:\Program Files
(x86)\VERITAS\VxPBX\bin\pbx_exchange.exe"
nbu-in-vnetd     dir=in   localport=13724  "C:\Program
Files\Veritas\NetBackup\bin\vnetd.exe"

```

```

Master Server
-----
nbu-out-pbx      dir=out  localport=1556  "C:\Program Files
(x86)\VERITAS\VxPBX\bin\pbx_exchange.exe"

nbu-in-pbx       dir=in   localport=1556  "C:\Program Files
(x86)\VERITAS\VxPBX\bin\pbx_exchange.exe"
nbu-in-vnetd     dir=in   localport=13724  "C:\Program
Files\Veritas\NetBackup\bin\vnetd.exe"

```

```

Ops Center Server
-----

```

```

NetBackup Search
-----

```

7.3.8 Before We Configure Our NetBackup Related Rules

...firstly - set some variables to be used by the firewall config commands...

```

set z_subnet=10.0.9.0/24
set z_x86_nbu=C:\Program Files (x86)\VERITAS
set z_x64_nbu=C:\Program Files\Veritas
set z_profile=private
set z_interface=lan
set

```

7.3.9 On Client

```

...client - inbound...
netsh advfirewall firewall add rule name=nbu-vrts-pbx dir=in action=allow protocol=TCP
localport=1556 localip="%z_subnet%" remoteport=any remoteip="%z_subnet%" profile=%z_profile%
program="%z_x86_nbu%\VxPBX\bin\pbx_exchange.exe" interface=lan

...if client is pre v7.0.1...
netsh advfirewall firewall add rule name=nbu-vnetd dir=in action=allow protocol=TCP localport=13724
localip="%z_subnet%" remoteport=13724 remoteip="%z_subnet%" profile=%z_profile%
program="%z_x64_nbu%\NetBackup\bin\vnetd.exe" interface=lan

...client - outbound...
netsh advfirewall firewall add rule name=nbu-vrts-pbx dir=out action=allow protocol=TCP
localport=1556 localip="%z_subnet%" remoteport=any remoteip="%z_subnet%" profile=%z_profile%
program="%z_x86_nbu%\VxPBX\bin\pbx_exchange.exe" interface=lan

...if client is pre v7.0.1...
netsh advfirewall firewall add rule name=nbu-vnetd dir=out action=allow protocol=TCP
localport=13724 localip="%z_subnet%" remoteport=13724 remoteip="%z_subnet%" profile=%z_profile%
program="%z_x64_nbu%\NetBackup\bin\vnetd.exe" interface=lan

...the above rules are enough for NetBackup v7.0.1+ client.

```

7.3.10 On NetBackup Admin Console for Windows

```
netsh advfirewall firewall add rule name=nbu-nbconsole dir=in action=allow protocol=TCP
localport=1556 localip="%z_subnet%" remoteport=any remoteip="%z_subnet%" profile=%z_profile%
program="%z_64_nbu%\NetBackup\bin\nbconsole.exe" interface=lan
```

7.4 Install OpsCenter Application Software

```
# N.B. Supported versions of IE with OpsCenter
OpsCenter v2.5.x      IE8, IE9          not IE10 or IE11
OpsCenter v2.6.0.x    IE8, IE9, IE10    not IE11
...so un-install whichever version is not required...
appwiz.cpl
...and select 'View installed updates'...
...and then un-install unwanted version of IE...
...after un-installing you may need to reboot...
...after rebooting, open IE and disable auto-install updates...
...then in Windows Update, right-click the version of IE that you do not want to re-install, and
select 'Hide Update'...

# install NetBackup Admin Console for Windows...

# install NetBackup Java Admin Console for Windows...

# install OpsCenter Server...
    (you will need a license to be able to successfully install OpsCenter Analytics)

# install OpsCenter Agent...
    (you will need this if you want to report on capacity licensing or traditional licensing of
appliance master(/media) servers)
```

7.5 Post OpsCenter and Admin Console Installs

7.5.1 Add NetBackup Binary Folders to Default System Wide 'path' Variable

```
Start -> Run -> sysdm.cpl
Select 'Advanced' tab
Click on 'Environment Variables...'
In the second lower panel named 'System variables' scroll down to, and select 'Path' and
select 'Edit...'
Now in the edit box, select 'Variable value:' and scroll to the right to the end, and append this
following path (note the leading semi-colon):
;C:\Program Files\Veritas\NetBackup\bin
;C:\Program Files\Veritas\NetBackup\bin\admincmd
;C:\Program Files\Veritas\NetBackup\bin\goodies
;C:\Program Files\Symantec\OpsCenter\server\bin
And support goodies
;C:\Program Files\Veritas\NetBackup\bin\support
;C:\Program Files\Veritas\pdde
;C:\Program Files\Veritas\Volmgr\bin
Click 'OK' to save
Click 'OK'
Click 'OK'

...and to test, you can...
Start -> Run -> cmd
path
bpgetconfig -L -g %computename%
```

7.5.2 Reduce Logging

```
vxlogcfg -l
```

```

for /f "skip=1" %a in ('vxlogcfg -l') do (vxlogcfg -l -p %a -o Default | find/i "Level")

for /f "skip=1" %a in ('vxlogcfg -l') do (vxlogcfg -l -p %a -o Default -a -s DebugLevel=0)
for /f "skip=1" %a in ('vxlogcfg -l') do (vxlogcfg -l -p %a -o Default -a -s DiagnosticLevel=0)

for /f "skip=1" %a in ('vxlogcfg -l') do (vxlogcfg -l -p %a -o Default | find/i "Level")

...check all OIDs (except Default, hence the second "skip=2"...
for /f "skip=1" %a in ('vxlogcfg -l') do (for /f "skip=2" %b in ('vxlogcfg -l -p %a') do (vxlogcfg
-l -p %a -o %b | find/i "Level" | find /v "Level = 0" ) )

...reset debug and diagnostic levels...
for /f "skip=1" %a in ('vxlogcfg -l') do (for /f "skip=2" %b in ('vxlogcfg -l -p %a') do (vxlogcfg
-r -p %a -o %b -s DebugLevel      ) )
for /f "skip=1" %a in ('vxlogcfg -l') do (for /f "skip=2" %b in ('vxlogcfg -l -p %a') do (vxlogcfg
-r -p %a -o %b -s DiagnosticLevel ) )

...re-list...
for /f "skip=1" %a in ('vxlogcfg -l') do (for /f "skip=2" %b in ('vxlogcfg -l -p %a') do (vxlogcfg
-l -p %a -o %b | find/i "Level" | find /v "Level = 0" ) )

```

7.5.3 Disable Some of the NetBackup Server Services

```

# ...which are not required by the Windows Admin Console installation...
# ...so that we cease false negative system event log entries for services that fail to start
properly, because they never will...
# ...because this guest VM is running only the NetBackup Admin Console variant of the NetBackup
Server software...
sc qc      "BMR Boot Service"
sc config "BMR Boot Service"          start= demand
sc qc      "BMR Boot Service"

sc config "NetBackup Event Manager"    start= disabled
sc config "NetBackup Proxy Service"    start= disabled
sc config "NetBackup Remote Manager and Monitor Service" start= disabled
sc config "NetBackup Request Daemon"   start= disabled
sc config "NetBackup SAN Client Fibre Transport Service" start= disabled
sc config "NetBackup Service Layer"    start= disabled
sc config "NetBackup Service Monitor"  start= disabled
sc config "NetBackup Storage Lifecycle Manager" start= disabled
sc config "NetBackup Vault Manager"    start= disabled

```

7.5.4 OpsCenter, Change Default Password

```

http://10.0.9.9/OpsCenter
  admin
  password

...if not auto-prompted to change password, then...
  ...click Settings      (located to the right of the top row of buttons)
  ...click My Profile    (located at the second tab on the third row of items in the web
admin UI)
  ...change Change Password (remember to use your password construct, e.g. 'password!opsc')

```

7.5.5 OpsCenter, Configure Database Backups

```

...to take a one-off backup...
mkdir X:\OPSC-DB-BACKUP

"C:\Program Files\Symantec\OpsCenter\server\bin\dbbackup.bat" "X:\OPSC-DB-BACKUP"
dir X:\OPSC-DB-BACKUP

...to configure regular backups...

...open 'Server Manager' via 'Run as administrator'...

```

...Actions - Enable All task History...

...create a scheduled task to run:

```
"C:\Program Files\Symantec\OpsCenter\server\bin\dbbackup.bat" "X:\OPSC-DB-BACKUP"
```

...and remember, if you don't backup the entire OpsCenter server, then to backup at least the following...

```
C:\Program Files\VERITAS\Security\Authentication\systemprofile
C:\Program Files\Symantec\OpsCenter\server\config\db.conf
X:\OPSC-DB-BACKUP
```

...for Unix, the script is:

```
/opt/SYMCOpsCenterServer/bin/dbbackup.sh /my_db_backup_dir
```

...and the files to also backup are:

```
/var/VRTSat
/opt/SYMCOpsCenterServer/config/db.conf
/my_db_backup_dir
```

7.5.6 OpsCenter, RAM/Memory

Be careful with the next two sections re memory adjustment. Don't over-allocate. The numbers shown below are simply examples. In every case you should re-consider how much to allocate to the server services/daemons.

7.5.7 OpsCenter, Tune Database Server

Edit the OpsCenter 'database server' config file:

```
C:\Program Files\Symantec\OpsCenter\server\db\CONF\server.conf
```

...and change the values to:

```
-c 1024 -ch 2048 -cl 1024 -cs
```

...where:

```
-c      initial memory reserved      of 1GB
-ch     maximum cache size           of 2GB
-cl     minimum cache size           of 1GB
-cs     enable logging of automatic  cache size adjustments
```

7.5.8 OpsCenter, Tune OpsCenter Server

Edit both of these files, and change the -Xmx values to 2048, to allow each service to claim a maximum of 2GB:

```
C:\Program Files\Symantec\OpsCenter\server\bin\OpsCenterServerService.xml
C:\Program Files\Symantec\OpsCenter\gui\bin\OpsCenterGUIService.xml
```

Then restart OpsCenter Server services:

...to stop:

```
<install_path>\Symantec\OpsCenter\Server\bin\opsadmin.bat stop
```

...to start:

```
<install_path>\Symantec\OpsCenter\Server\bin\opsadmin.bat start
```

7.6 Configure Some Regular OpsCenter Reports

7.6.1 Create a Recipient

Settings / Recipients

Email Recipient Name:

Email Address:

Active: yes

Save

7.6.2 Create a Time Schedule

Reports / Schedules

Daily / 10:00 / Daily / Recur every: 1 day / Starting... / No end date

7.6.3 Create a Report: Two Week Success Rate

Reports / My Reports / Create New Report

Select Parameters

Time Frame

Relative TimeFrame: 2 weeks

Time Frame Grouping:

1 day

Filters....

View

All My Views

Master Server

=

master1

Media Server (n/a)

Client (n/a)

Policy (n/a)

Schedule (n/a)

Job / Job Type

=

Backup

Success Rate (n/a)

Next>

Modify Display Options

Common Properties

Report On:

None

<<<

Historical Chart Properties

x-Axis Display Name: Date/Time

y-Axis Display Name: Success Rate (%)

Target Performance: [] Y1-Axis [100] %

Description: Susccess rate.

Next>

7.6.4 Create a Report: Weekly Success Rate by Media Server

Reports / My Reports / Create New Report

Select Parameters

Time Frame

Relative TimeFrame: 1 week

Time Frame Grouping:

1 day

Filters....

View

All My Views

Master Server (b/a)

Media Server (n/a)

Client (n/a)

Policy (n/a)

Schedule (n/a)

Job / Job Type

=

Backup

Success Rate (n/a)

Next>

Modify Display Options

Common Properties

Report On:

Media Server

<<<

Historical Chart Properties

x-Axis Display Name: Date/Time

y-Axis Display Name: Success Rate (%)

Target Performance: [] Y1-Axis [100] %

Description: Susccess rate.

Next>

7.6.5 Create a Report: Scratch Tape Count Report

Reports / My Reports / Create New Report

Report Category/Subcategory

Report Category: Backup/Recovery

Subcategory: Media

Report View Type

Tabular

Time Frame

No Time Basis

Filters

View All My Views

Master Server n/a

Media Server n/a

Media n/a

Media

Media Volume Pool Name = Scratch

Media Library Slot Number = From 1 to 9999

Tape Library n/a

Next>

Tabular Report Properties

Description: blah

Display Unit: GB

Time Duration: Days

Select columns:

	Selected Columns	Column Alias	Sort Order	Operation
	Tape Library Alias	Tape Library Alias	None	None
	Media ID	Media		
ID	None	Count <<<		
	Volume Pool Name	Volume Pool Name	None	None
	Media Volume Group Name	Media Volume Group		
Name	Ascending	None <<<		

Rows Per Page: 20

Conditions

Media ID = n/a From: [] To: []

Next>

??? incomplete...

[end]

8 Example, Patch/Upgrade of a Virtual NB52x0 Master Appliance

WARNING:

To upgrade virtual appliances you MUST use the console within the VM host software.
To upgrade physical appliances you MUST use the IPMI console.

NEVER use ssh/PuTTY terminal sessions to perform a patch/upgrade of an appliance, be it virtual or physical.

WARNING:

Do NOT use these note to perform upgrades of appliances that contain real data. These notes are only to be used in a test lab where data loss is of no consequence whatsoever. To upgrade real appliances, or physical larger labs, you must thoroughly review the release notes, Symantec SORT, and all associated tech notes and manuals, and plan your upgrade(s) accordingly.

8.1 First Some Notes Re Upgrades

If you have an OpsCenter Server v7.1.x.x covering an appliance master server running v2.0.3, or a traditional master server running v7.x.x.x, then you must upgrade OpsCenter Server to v7.5 and then to the appropriate v7.5.x.x patch BEFORE upgrading the appliance, or traditional, master server.

When upgrading from v2.0.3 to higher, always copy up v2.5B (aka v2.5-2) AND the latest v2.5.x kit (which is v2.5.4 (aka v2.5.4-1)) - as they must be done one after the other, followed by a catalog migration (more below).

If upgrading a master server appliance from v2.0.3 to v2.5.x (or a traditional master server from v7.1.x to v7.5.x), then disable OpsCenter data collection for the master server being upgraded.

A catalog backup policy must exist. Even a brand new v2.0.3 appliance master server must have a catalog backup policy configured BEFORE starting the upgrade process - otherwise, phase 2 of catalog migration (i.e. the 'bpimage -cleanup -allclients' job) will not complete successfully.

The versions are:

Appliance release	NetBackup pdos-release	NB Build Date Time	Build Num	SuSE	nbapp-
-----	-----	-----	-----	----	-----
v2.0.1					
v2.0.2					
v2.0.3	v7.1.0.8	Mon 30-Apr-2012 12:54:52	20120430	10 SP4	2.0.3 BN:
20120430	6.6.0.329				
v2.5b	v7.5.0.2	Wed 29-May-2012 02:35:22	20120508	10 SP4	2.5 BN:
20120510	6.6.0.329				
v2.5.1b	v7.5.0.4	Sub 16-Sep-2012 10:52:59	20120916	10 SP4	2.5.1 BN:
20121114	6.6.0.329				
v2.5.2	v7.5.0.5	Sat 9-Feb-2013 23:12:18	20130209	10 SP4	2.5.2 BN:
20130220	6.6.0.329				
v2.5.3	v7.5.0.6	Mon 10-Jun-2013 21:21:34	20130610	10 SP4	2.5.3 BN:
20130628	6.6.0.329				
v2.5.4	v7.5.0.7	Sat 23-Nov-2013 21:05:56	20131123	10 SP4	2.5.4 BN:
20131204	6.6.0.329				
v2.6.0.1	v7.6.0.1	Wed 13-Nov-2013 14:00:02	20131113	11 SP1	2.6.0.1 BN:
20131113	6.6.0.329				
v2.6.0.2	v7.6.0.2	Thu 24-Apr-2014 15:28:32	20140424	11 SP1	2.6.0.2 BN:
20140424	6.6.0.329				
v2.6.0.3	v7.6.0.3	Sun 6-Jul-2014 21:04:49	20140706	11 SP1	2.6.0.3 BN:
20140709	6.6.0.329				
v2.6.0.4	v7.6.0.4	???			
v2.6.1	v7.6.1	Mon 27-Oct-2014 22:01:02	20141027	11 SP1	2.6.1 BN:
20141118	6.6.0.329				

FYI:

- Upgrades to v2.6.0.1 and v2.6.0.2 no longer work for virtual appliances.
- However, it is still possible to install and configure virtual v2.6.0.1 and v2.6.0.2 and v2.6.0.3 appliances, if one uses the official installer ISOs. I haven't tried converting v2.6.0.x USB sticks to ISOs as I haven't got any actual v2.6.0.x USB sticks.

8.2 Master/Media Server Pre-Upgrade Actions

- Prepare patch kits - N.B. you may need more than one...
 - download pre-split tar files
 - confirm MD5 of pre-split tar files
 - join the pre-split tar files
 - extract rpm file
 - confirm MD5 of rpm file
- Before upgrading a master server (be it appliance based, or a traditional server) then ALWAYS take a full catalog backup.
- Before upgrading the master server, de-activate the environment...
 - de-activate all backup policies
 - de-activate all SLP policies
 - de-activate all DSSUs
 - de-activate all media servers
 - ensure no jobs are running
- Quieten the environment...
 - logoff any ssh/PuTTY sessions
 - close all NetBackup Admin Consoles (Java and/or Windows)
 - for the master being upgraded, de-activate data collection on related OpsCenter server(s)

8.3 Example, Upgrading a NB52x0 Master from v2.0.3 to v2.5B to v2.5.4

8.3.1 Upload Software Kits

on appliance console, logon, and open the share to receive the patch kit...

```
admin
<password!admin>
```

```
manage
  software
  list version
  list downloaded
  list
  share open
```

...on the VM host, copy the base v2.5B kit AND the v2.5.4 patch kit up to the master server...

```
# ...if VM host is MacOSX or Linux...
sudo mkdir /mnt/master1
sudo mount master1:/inst/patch/incoming /mnt/master1
cp -v SYMC_NBAPP_update-2.5-2.x86_64.rpm /mnt/master1/
cp -v SYMC_NBAPP_update-2.5.4-1.x86_64.rpm /mnt/master1/
sudo umount /mnt/master1
```

```
# ...if VM host is Windows...
net use Z: \\master1\incoming /user:admin password!admin
copy SYMC_NBAPP_update-2.5-2.x86_64.rpm Z:\
copy SYMC_NBAPP_update-2.5.4-1.x86_64.rpm Z:\
net use Z: /delete
```

...alternatively, you could just copy the patch kits up directly using scp (native on MacOSX/Linux) or pscp (from PuTTY for Windows)...

...FYI - you won't be able to do this from v2.6.0.2 onwards as the admin and root accounts are locked down...

```
[p]scp SYMC_NBAPP_update-2.5-2.x86_64.rpm admin@master1:/inst/patch/incoming/
[p]scp SYMC_NBAPP_update-2.5.4-1.x86_64.rpm admin@master1:/inst/patch/incoming/
```

now back on the appliance...

```
manage
  software
  share close
```

```
# check packages; and if they pass verification, they will be automatically/silently moved from
/inst/patch/incoming to an internal holding folder...
    list downloaded
    return
    return
```

8.3.2 Take a Pre-Upgrade Snapshot

```
# next we want to shutdown virtual appliance, take a snapshot (not a clone), then reboot virtual
appliance...
```

```
support
    shutdown
    yes
    exit
```

```
# use VM host software to take a snapshot...
```

8.3.3 Perform Upgrades

```
# power-on/startup appliance...
```

```
# now perform the patch/upgrade from v2.0.3 to v2.5B (aka 2.5-2)...
```

```
# ...but first we always perform a status check...
```

```
support
    test software
    return
# ...if the test fails, then try restarting the NetBackup processes...
    processes
    netbackup show
    netbackup stop
    netbackup start
    netbackup show
    return
```

```
# ...and re-attempt the test...
```

```
    test software
    return
```

```
# ...now perform the patch/upgrade...
```

```
manage
    software
    install SYMC_NBAPP_update-2.5-2.x86_64.rpm
```

```
# the above will unpack the rpm and then performs some checks, and asks for permission to reboot...
```

```
# ...and gave an approximate time to install duration of 45 minutes...
```

```
    yes
```

```
# a short while later, you will be prompted again, this time to confirm catalog migration...
```

```
    yes
```

```
# the patch install will continue, and reboot...
```

```
# note how NetBackup does not start - you MUST now install a v2.5.x patch - and it is recommended
to go with the highest v2.5.x patch which is v2.5.4.
```

```
# when back, login at console again, and install v2.5.4 (aka 2.5.4-1)...
```

```
# ...which will prompt again, before continuing to completion...
```

```
# ...when this finishes NetBackup will not start, and the post install self check will fail
because...
```

```
# ...NetBackup will not start properly until the catalog migration process has completed.
```

```
# ...so, to complete catalog migration...
```

```
support
    maintenance
    P@ssw0rd
    elevate
```

```
# ...this next step of starting NetBackup will cause phase 1 of catalog migration to run...
```

```

bpps -x
netbackup start
bpps -x

# ...check status of phase 1 migration...
nbemmcmd -list_settings -brief -machinename master1
nbemmcmd -list_settings -brief -machinename master1 | egrep -i "slp_|list_"

# ...if SLP_DSSU_MIGRATION_STATE = "1" ...then phase 1 has completed...
# ...if LIST_FS_IMAGE_HEADERS = "0" ...then phase 2 has completed...
# ...if LIST_FS_IMAGE_HEADERS = "1" ...OR IS NOT LISTED... then phase 2 has NOT
completed... at this stage this is expected...

# ...before running phase 2, collect the most recent job number, this is so that we can
determine...
# ...which 'Image Cleanup' job was actually the 'phase 2' migration job...
bpdbjobs | head -5

# ...now cause the phase 2 of catalog migration to run by running an image cleanup...
bpimage -cleanup -allclients

# ...and wait for the 'Image Cleanup' job to complete, which must finish with status '0'...
# ...if any other status (even '1') is seen, then reverse the job detail log, and investigate and
resolve...
bpdbjobs | head -5
bpdbjobs -jobid N -all_columns

# ...check phase 2 migration...
nbemmcmd -list_settings -brief -machinename master1
nbemmcmd -list_settings -brief -machinename master1 | egrep -i "slp|list"

# ...if SLP_DSSU_MIGRATION_STATE = "1" ...then phase 1 has completed...
# ...if LIST_FS_IMAGE_HEADERS = "0" ...then phase 2 has completed...
# ...if LIST_FS_IMAGE_HEADERS = "1" ...OR IS NOT LISTED... then phase 2 has NOT
completed.

# ...for small lab environments, both phases 1 and 2 will complete very quickly...
# ...however, if the EMM settings do not reveal successful completion...
# ...then you will very likely have a problem, so investigate and resolve as you would any other
issue/problem...

# check for any images that may have been moved, by the catalog migration phases, to the 'corrupt'
folder...
ls -lash /usr/openv/netbackup/db.corrupt
# ...if the folder does not exist, then there were no corrupt images.

# now re-activate the environment, in this sequence...
re-activate media servers
re-activate DSSUs
re-activate SLP policies
re-activate backup policies

# now run a full catalog backup, and confirm that this completes successfully.

# you should now have a working upgraded master server.

```

8.4 Upgrading an Un-configured NB52x0 Master from v2.5.2 to v2.5.3

This worked.

8.5 Upgrading an Un-configured NB52x0 Master from v2.5.3 to v2.5.4

This worked.

8.6 Example, Upgrading a Configured Virtual NB52x0 Master from v2.5.2 to v2.6.0.1

This failed - so, I guess only bother if you think you can fix it :)

```
manage
  software
  list downloaded
  install SYMC_NBAPP_update-2.6.0.1-1.x86_64.rpm

...but fails with...
...
Checking state of system RAID1...      failed
ERROR: Failed to determine system drive parameters - please check the status of the system RAID1
disk and resolve any issues with it.
- [Error] Install script failed.
- [Error] Update installation script exited with failure.
- [Error] Failed to install the software update SYMC_NBAPP_update-2.6.0.1-1.x86_64.rpm.

...it looks as though the installer script(s) attempt to check RAID disks, but there aren't any on
a virtual NB52x0.
```

8.7 Example, Upgrading an Un-Configured Virtual NB52x0 Master from v2.6.0.1 to v2.6.0.2

This failed. Details included below for info.

FYI - it is still possible to [p]scp the rpm kit via the 'admin' account to v2.6.0.1, so:

```
manage / software / share open
$ [p]scp SYMC_NBAPP_update-2.6.0.2-1.x86_64.rpm admin@x.x.x.x:/inst/patch/incoming
manage / software / share open
manage / software / list downloaded
manage / software / install SYMC_NBAPP_update-2.6.0.2-1.x86_64.rpm
```

...and the following was seen...

```
- [Info] Comparing the currently installed version with the target version.
Verify whether the software update, SYMC_NBAPP_update-2.6.0.2-1.x86_64.rpm has been installed on
compute node, nb-appliance. ... ok
ok
- [Error] Failed to reduce swap.
- [Info] The software upgrade has been aborted!
```

```
manage / software / upgradestatus
```

The appliance version is 2.6.0.1 and not in upgrade state.

So, it is not possible to patch upgrade an un-configured virtual v2.6.0.1 NB52x0 appliance to v2.6.0.2.

Now testing whether it is possible to patch upgrade a 'configured' virtual v2.6.0.1 NB52x0 appliance to v2.6.0.2...

```
network / configure 10.0.9.x 255.255.255.0 10.0.9.1 eth2
network / hosts add / 10.0.9.x master1.me.com master1
network / hostname set master1.me.com
```

```
appliance / status
appliance / master
```

was asked for sizes and names etc...

...accidentally hit return which may have interrupted the configuration process...

got some errors from a VxVM module, and from VxATD, re unable to allocate memory.

went in to a loop in the background, console appeared to return to CLish but was unable to run anything

so did an exit, but admin login prompt never re-appeared, and errors still appearing on console so powered off, and rebooted - appeared to come up fine

but

```
appliance / status
```

still said un-configured

so tried again

```

    appliance / master
and this appeared to run through ok
so
    support / reboot
came up ok, and appliance/status says it was a master
licences not lost
re-trying manage/software/install SYMC_NBAPP_update-2.6.0.2-1.x86_64.rpm
but slightly different error this time...
- [Error] Failed to disable swap. Reboot and try running patch install again.
- [Info] The software upgrade has been aborted!

so, rebooting...
    support/reboot
after rebooted...
...then will try shutting down NetBackup application, before re-trying the upgrade...
    support/processes/netbackup stop

...and then re-try the install...
    manage/software/install SYMC_NBAPP_update-2.6.0.2-1.x86_64.rpm
...but error received...
- [Error] Unable to gather backup job summary information. This may indicate that some
processes are not running and that you should restart your appliance.
- [Info] The software upgrade has been aborted!

...so restarted processes...
    manage/processes/netbackup start
...and now trying install again...
    manage/software/install SYMC_NBAPP_update-2.6.0.2-1.x86_64.rpm

...got the same "Failed to disable swap." message.

So, it is not possible to upgrade virtual v2.6.0.1 appliances to v2.6.0.2.

```

8.8 About v2.6.1 Appliances

8.8.1 Example, Upgrading an Unconfigured VM Appliance from v2.6.0.3 to v2.6.1

This was tested, so that I could have a base 'template v2.6.1 appliance' that I could later clone to make v2.6.1 master servers and/or v2.6.1 media servers.

An upgrade of an unconfigured v2.6.0.3 appliance to v2.6.1 - appeared to work.

However, the subsequent CLIsh based configuration as a master failed...

```

test-261-master1.Main_Menu> Appliance
test-261-master1.Appliance> Master
- [Info] Checking current state of the appliance
- [Info] Scanning storage system...
- [Info] The scan operation can take up to 15 minutes to complete.
- [Info] Refreshing the storage devices...
- [Info] Acquired lock on the storage.
- [Info] Looking for existing storage configurations...
- [Warning] Failed to query SCSI device '/dev/system/root'.
- [Info] No existing storage configurations found.
- [Info] Looking for existing storage configurations...
- [Warning] Failed to query SCSI device '/dev/system/root'.
- [Error] Failed to locate Base disk.
test-261-master1.Appliance>

```

8.8.2 After Booting a New v2.6.1 Virtual Appliance, the Attempt to Set as Master Failed

So, I tries a fresh boot install of v2.6.1, and tried to use the web-admin UI to initiate configuration as a master server, and this failed too:

```

- [Info] FQDN name is 'test-261.me.com'
- [Info] Validating the hostname 'test-261.me.com'

```

```

- [Info] Validating the short hostname 'test-261'
- [Info] Gathering license information
- [Info] Stopping NetBackup processes.
- [Info] Removing current NetBackup configuration.
- [Info] Performing Deduplication Engine cleanup.
- [Info] Hostname set to 'test-261'.
- [Info] Re-initializing NetBackup with the new host name
- [Info] Creating basic NetBackup configuration on appliance 'test-261'
- [Info] Reconfiguring NetBackup databases
- [Info] Configuring NetBackup logging on appliance 'test-261'
- [Info] Starting NetBackup processes on appliance 'test-261'
- [Info] Waiting for NetBackup processes to start
- [Info] Updating CLI views of appliance 'test-261'
- [Info] Updating client install media for appliance 'test-261'
- [Info] Operation completed successfully.
- [Info] Checking current state of the appliance
- [Info] Scanning storage system...
- [Info] The scan operation can take up to 15 minutes to complete.
- [Info] Refreshing the storage devices...
- [Info] Acquired lock on the storage.
- [Info] Looking for existing storage configurations...
- [Warning] Failed to query SCSI device '/dev/system/root'.
- [Info] No existing storage configurations found.
- [Info] Looking for existing storage configurations...
- [Warning] Failed to query SCSI device '/dev/system/root'.
- [Error] Failed to locate Base disk.

```

8.8.3 Example, Upgrading an Already Configured VM Appliance Master from v2.6.0.3 to v2.6.1

Some good news, is that a v2.6.0.3 master can be upgraded to v2.6.1.

The previous noted issues with v2.6.1 mean that it's not possible to keep a base v2.6.1 template.

First step is to upload the v2.6.1 update kit to the v2.6.0.3 master server.

```

$ ssh admin@10.0.9.142
Password:
Last login: Tue Jan 20 15:04:11 2015
test-2603.Main_Menu> Manage
test-2603.Manage> Software
test-2603.Software> Share Open
The CIFS share \\test-2603\incoming patches
and the NFS share test-2603:/inst/patch/incoming have been opened on this appliance.
test-2603.Software> Exit
Connection to 10.0.9.142 closed.
$ ls
SYMC_NBAPP_update-2.6.1-2.x86_64.rpm
$ sudo mkdir /mnt/master
$ sudo mount nfs -o resvport 10.0.9.142:/inst/patch/incoming /mnt/master
$ cp -v SYMC_NBAPP_update-2.6.1-2.x86_64.rpm /mnt/master
SYMC_NBAPP_update-2.6.1-2.x86_64.rpm -> /mnt/master/SYMC_NBAPP_update-2.6.1-2.x86_64.rpm
$ sudo umount /mnt/master
$ ssh admin@10.0.9.142
Password:
Last login: Tue Jan 20 15:04:11 2015
test-2603.Main_Menu> Manage
test-2603.Manage> Software
test-2603.Software> Share Close
Software update shares closed successfully.
test-2603.Software> List Downloaded
Validating update 'SYMC_NBAPP_update-2.6.1-2.x86_64.rpm' ... ok
Software updates downloaded:
Patch_Name                               Size    Release_Date    NBU_Version
SYMC_NBAPP_update-2.6.1-2.x86_64.rpm     2.9G    Tue Dec 30 2014    7.6.1

```

- ...then...
- Shutdown VM
- Snapshot VM, name snapshot as "2603-pre-261"

- Boot VM
- Logon as admin to CLISH via console/IPMI
- Manage > Software >

```
test-2603.Software> Install SYMC_NBAPP_update-2.6.1-2.x86_64.rpm
- [Info] The installed version meets the minimal requirement for this software upgrade.
- [Info] cat percentage used is 9.
- [Info] The preflight check for the used percentage on /cat passed.
- [Info] The preflight check for free space passed.
- [Info] The checking for system clock passed.
- [Info] the master version meets the minimal version requirement of the software upgrade.
>> The installation of the software update requires the Appliance Web Console to stop. To monitor
the installation status log on to the NetBackup Appliance Shell Menu and run the "Manage > Software
> UpgradeStatus" command. Do you want to continue?(yes/no) yes
```

```
Counting PDDE objects...
  Counting the number of SOs and DOs...
  Counting the number of POs...
  Finding the number of containers...
```

```
PO Count: 0
DO Count: Not found
SO Count: Not found
Containers: 0
```

Conversion of this storage pool should take approximately:

Less than a minute

NOTE: Actual conversion time may vary depending on several factors including disk fragmentation, data locality and segment duplication.

The effect of segment duplication cannot be quickly predicted before the conversion is run.

NOTE: Multiple runs of this tool will result in lower and lower estimates, due to file system caching. The first run will be the most accurate.

- [Info] Appliance needs 23GB of unallocated storage space for upgrade.
- [Info] Performing sanity check on disks and partitions... (5 mins approx)

Partition	Total	Available	Used	%Used	Status
MSDP	688 GB	682.26 GB	5.7348 GB	1	Optimal
Unallocated	1.9686 GB	-	-	-	-

- [Info] Shrinking the Deduplication partition to continue with the software upgrade...

- [Info] Comparing the currently installed version with the target version.

Verify whether the software update, SYMC_NBAPP_update-2.6.1-2.x86_64.rpm has been installed on compute node, test-2603. ... ok

ok

- [Info] Patch install requirement check passed.

>>

This software update requires a reboot of the appliance after the installation process completes.

Do you want to continue? (yes/no) yes

- [Info] The software upgrade operation has started.

```
test-2603.Software> UpgradeStatus
```

The appliance is creating a pre-upgrade checkpoint!

```
test-2603.Software> UpgradeStatus
```

The appliance is running self test on test-2603!

```
test-2603.Software> UpgradeStatus
```

The target version is: 2.6.1

The appliance is in upgrade and complete at 1%.

```
test-2603.Software> UpgradeStatus
```

The target version is: 2.6.1

The appliance is upgrading the OS components.

```
test-2603.Software> UpgradeStatus
```

The target version is: 2.6.1

The software installation has begun and it is 40% complete.

```
test-2603.Software> UpgradeStatus
```

The target version is: 2.6.1

The software installation has begun and it is 55% complete.

```
test-2603.Software> UpgradeStatus
```

The target version is: 2.6.1

The appliance is upgrading the Storage Foundation components...

Broadcast message from root (Tue Jan 20 14:46:33 2015):

The system is going down for reboot NOW!

```
test-2603.Software> UpgradeStatus
```

The target version is: 2.6.1

Rebooting appliance(It may take approximately 10 minutes)...

```
test-2603.Software> Exit
```

Connection to 10.0.x.x closed

- System rebooted itself.
- After some time, saw 'Upgrade Complete' on the console.
- Then converts PDDE objects:
 - See: /msdp/data/dpl/pdvol/log/convert
- Then auto-configures new MSDP 'deduplication pool catalog backup policy'.
- Then performs a self check - [PASS] - yay!
- Now logon to CLish...

```
test-2603.Main_Menu> Appliance
```

```
Appliance > Status
```

Appliance Model is NetBackup Appliance 5220VM.

Appliance Version is 2.6.1.

Appliance is configured as master appliance.

All storage partitions are below watermark.

- Noticed that the console indicated that the NetBackup product (shown in red) had not fully started.
- So, manually rebooted virtual appliance.
- And now looks ok.
- FYI - before doing the upgrade to v2.6.1, I had previously uploaded the Windows Client add-on package for v7.6.0.3. After the upgrade to v2.6.1, the web-admin console still shows this v7.6.0.3 Windows client add-on package.
- The next step shows upload and install of v7.6.1 Windows client add-on package.

```
$ ssh admin@10.0.9.142
```

Password:

Last login: Tue Jan 20 15:04:11 2015

```
test-2603.Main_Menu> Manage
```

```
test-2603.Manage> Software
```

```
test-2603.Software> Share Open
```

The CIFS share \\test-2603\incoming patches

and the NFS share test-2603:/inst/patch/incoming have been opened on this appliance.

```
test-2603.Software> Exit
```

Connection to 10.0.9.142 closed.

```
$ ls
```

SYMC_NBAPP_addon_nbclient_MACINTOSH-7.6.1-SLES11.x86_64.rpm

SYMC_NBAPP_addon_nbwin-7.6.1-SLES11.x86_64.rpm

SYMC_NBAPP_update-2.6.1-2.x86_64.rpm

```
$ sudo mkdir /mnt/master
```

```
$ sudo mount_nfs -o resvport 10.0.9.142:/inst/patch/incoming /mnt/master
```

```
$ cp -v SYMC_NBAPP_addon_nbwin-7.6.1-SLES11.x86_64.rpm /mnt/master
```

```
$ sudo umount /mnt/master
```

```
$ ssh admin@10.0.9.142
```

Password:

Last login: Tue Jan 20 15:20:18 2015 from vmhost.me.com

```
test-2603.Main_Menu> Manage
```



```

test-2603.Manage> Software
test-2603.Software> Share Close
Software update shares closed successfully.
test-2603.Software> List Downloaded
Validating update 'SYMC_NBAPP_addon_nbwin-7.6.1-SLES11.x86_64.rpm' ... ok
Software updates downloaded:
Patch_Name                               Size  Release_Date      NBU_Version
SYMC_NBAPP_addon_nbwin-7.6.1-SLES11.x86_64.rpm  901M  Sat Nov 08 2014    7.6.1
SYMC_NBAPP_update-2.6.1-2.x86_64.rpm          2.9G  Tue Dec 30 2014    7.6.1
test-2603.Software> Delete SYMC_NBAPP_update-2.6.1-2.x86_64.rpm
test-2603.Software> Install SYMC_NBAPP_addon_nbwin-7.6.1-SLES11.x86_64.rpm
Do you want to proceed with the installation of this addon?(yes/no) yes
Acquiring appliance exclusive lock ... ok
Checking the add-on 'SYMC_NBAPP_addon_nbwin-7.6.1-SLES11.x86_64.rpm' ... ok
Checking whether the add-on is already installed ... no
Proceeding to install the update ... ok
- [Warning] No recipients are configured to receive software notifications. Use 'Settings->Alerts->Email Software Add' command to configure the appropriate Email address.
- [Info] Successfully installed the add-on SYMC_NBAPP_addon_nbwin-7.6.1-SLES11.x86_64.rpm.

    • Now the web-admin console shows only one Windows add-on client kit, for v7.6.1.

```

9 Other NetBackup Actions

9.1 Configure BMR On Master Server Appliance

9.1.1 SRT naming convention

SRTs live on BMR Boot Servers - they do not reside upon the master server, or media servers - unless of course your master and/or media servers are also BMR boot servers.

SRT names can only be eight characters, letters and numbers and underscore only. So, in anything but the smallest of environments, you will need to determine a naming convention for SRTs - otherwise things will very quickly get messy and out-of-control...

...so, perhaps an SRT naming convention of:
OOOONNNN

...where: OOOO is an O/S identifier
...and: NNNN is the version of the embedded NetBackup Client e.g. 70 701 71 7104 75 7501 7502 7503 7504 7505 7506

...where the first 'O' in 'OOOO' is one of:

A AIX
F FreeBSD
H HP-UX
I (reserved, see below)
R RHEL
S Solaris SPARC
T (reserved, see below)
U SuSE
X Solaris x86_64

...and next three 'OOO' characters are some form of O/S version and service pack number perhaps ?

...and these two special 'OOOO' instances of...

W32_ Windows fast restore (i.e. non-legacy) for 32-bit clients
W64_ Windows fast restore (i.e. non-legacy) for 64-bit clients

...and having reserved letters 'I' and 'T' for job/task/incident or anything site specific...

I9999999 indicating that an SRT is specific to a particular INC incident ticket.
T9999999 indicating that an SRT is specific to a particular TSK task ticket

9.1.2 Issues with BMR boot across subnets

Most variants of NetBackup BMR Client do not support booting across different subnets. So, if you have two machines of the same O/S in the same subnet, then... we could configure each to be a boot server (with SRTs) of each other - but I'm not sure how this would help in a site DR situation where there is no first machine :/

Whenever a NetBackup client is installed - then BMR Boot Server is automatically installed too (if the client O/S is supported for BMR), so, seeing as each backup client will likely be in the same backup subnet, then as long as the required ports are open, then we could use client machines to provide BMR boot servers (for O/S variants that are supported for BMR) for themselves.

9.1.3 Example Initial Setup of BMR Master Server on a Virtual Appliance

On a virtual appliance I tried using the GUI feature of:

http://x.x.x.x/appliance

Settings / NetBackup / Advanced / Enable BMR On this Appliance: / and click "Save"

...but it just sat there - and never came back...

...however, on v2.6.0.1/2 the WebAdmin GUI based enablement of BMR seems to work...

...logon to http://x.x.x.x/appliance, then click Manage / Host / Advanced, and enable BMR.

So, login to the CLish, Support / Maintenance / elevate... then...

```

bmrsetupmaster -size small
[Info] V-127-41 Setting up BMR Database ...
[Info] V-127-38 Initializing BMR database ...
[Info] V-127-39 Loading BMR database ...
[Info] V-127-68 Loading data from unattend.txt into BMR database ...
[Info] V-127-68 Loading data from BMRDB.install.sql into BMR database ...
[Info] V-127-68 Loading data from PnpDB_2000.xml into BMR database ...
[Info] V-127-68 Loading data from PnpDB_2000SP1.xml into BMR database ...
[Info] V-127-68 Loading data from PnpDB_2000SP2.xml into BMR database ...
[Info] V-127-68 Loading data from PnpDB_2000SP3.xml into BMR database ...
[Info] V-127-68 Loading data from PnpDB_2000SP4.xml into BMR database ...
[Info] V-127-68 Loading data from PnpDB_2003SP1.xml into BMR database ...
[Info] V-127-68 Loading data from PnpDB_WinPE_2003SP1.xml into BMR database ...
[Info] V-127-68 Loading data from PnpDB_XP.xml into BMR database ...
[Info] V-127-68 Loading data from PnpDB_XPSP1.xml into BMR database ...
[Info] V-127-68 Loading data from PnpDB_XPSP2.xml into BMR database ...
[Info] V-127-68 Loading data from PnpDB_2003.xml into BMR database ...
[Info] V-127-68 Loading data from PnpDB_2003SP2.xml into BMR database ...
[Info] V-127-68 Loading data from PnpDB_WinPE_2003SP1_X64.xml into BMR database ...
[Info] V-127-68 Loading data from PnpDB_WinPE_2008.xml into BMR database ...
[Info] V-127-68 Loading data from PnpDB_WinPE_2008_X64.xml into BMR database ...
[Info] V-127-68 Loading data from RuleDB_WinPE_Compatibility.xml into BMR database ...
[Error] V-127-53 Failed to establish Database connection.
[Info] V-127-67 Failed to setup BMR master server.

```

...appears to have failed above, run same command again...

```

bmrsetupmaster -size small
[Info] V-127-41 Setting up BMR Database ...
[Info] V-127-57 Nothing to setup. Performing BMR DB upgrade.
Verifying the running version of BMRDB ...
BMRDB version 7.5.0.5 verified.
Nothing to upgrade. Version unchanged.
Database [BMRDB] validation successful.
[Info] V-127-66 Setting up BMR master server completed successfully.

```

```

nbemmcmd -listhosts
NBEMMCMD, Version: 7.5.0.5
The function returned the following failure status:
database server is down (23)
Command did not complete successfully.

```

...but it leaves the EMM down...
...so a quick restart of NetBackup...

```

bpps
netbackup stop
bpps
netbackup start
bpps

```

```

nbemmcmd -listhosts
NBEMMCMD, Version: 7.5.0.5
The following hosts were found:
server          master1
ndmp             master1
master          master1
Command completed successfully.

```

...seems ok now...

...I'll probably never need to BMR recover a SuSE 10 SP4+ client in this lab environment...
...but I just wanted to see whether it would be possible to also register an appliance master server as a BMR boot server...
...but there is probably no need for anyone else to attempt this next command...

```

bmrsetupboot -register
[Warning] V-127-64 tftpd service is not active.

```

Please verify TFTP server is installed and [X]INETD is properly configured.
 This is required in order to do BMR network boot based client restore.
 V-128-292 Cannot open "/etc/dhcpd.conf" for input: No such file or directory
 V-128-577 Error loading "/etc/dhcpd.conf" file.
 Please be sure the DHCPD server package is correctly installed and configured.
 [Warning] V-127-65 Error loading the DHCP configuration file.
 Please be sure the DHCPD server package is correctly installed and configured.
 This is required in order to do BMR network boot based client restore.
 [Info] V-127-76 Setting up BMR boot server completed successfully.

```
bmrs -o list -res bootserver
Host      Operating System Architecture Version Id
-----
master1   LINUX SLES 10.0   x86_64      7.5.0.5 1
```

...and you can try various other list resource commands...

```
bmrs -o list -res srt
bmrs -o list -res bootserver
bmrs -o list -res client
bmrs -o list -res config
bmrs -o list -res package
```

```
bmrs -o list -res discovertask
bmrs -o list -res discovertasklog
```

```
bmrs -o list -res restoretask
bmrs -o list -res restoretasklog
```

9.1.4 Example configuring BMR SRTs for Windows

```
# ...you will need to guest VMs, to act as BMR backup clients, and BMR boot servers for each
other...
# ...after building the guest VMs, install NetBackup Client, configure backup policies, enable BMR,
and take a full backup...
# ...then on each client create a folder to host the BMR SRT...
mkdir C:\SRT

# ...and register each as a BMR boot server...
bmrsetupboot -register
```

9.1.5 Create our first Windows "fast restore" (i.e. non legacy) SRT (Shared Resource Tree)

N.B. Because our test backup clients are running NetBackup Client v7.5.0.5, we are actually going to firstly create two SRTs.

Because an SRT must have at least a base version NetBackup Client added to it:

```
first      Windows fast restore      + NetBackup Client base v7.5
```

...which will then be copied, and then have a NetBackup Client patch added to it, to give us the SRT that we require:

```
second     Windows fast restore      + NetBackup Client base v7.5      + NetBackup Client
patch v7.5.0.5
```

...from a DOS/cmd box, start the SRT Administration Wizard:

```
bmrsrtadm
...click      Next>
...select     Create a new Shared Resource Tree.
...click      Next>

...select     Create a new Fast Restore Shared Resource Tree
...click      Next>

...select     Architecture:          64 bit (AMD64)
...enter      Name:                  W64_75                                (N.B. only eight
characters are allowed)
...enter      Description:           Windows 64-bit, NetBackup v7.5
...enter      Target location....:   C:\SRT
```

```
...click      Next>
```

N.B. be careful in this next step to select the (i.e. 64-bit for this particular SRT) correct SRD file:

```
...enter      Source location of SRD (WIM
path):        D:\NBU_SOFTWARE\Servers\NetBackup_Windows_x64_Server_v7.5\Addons\x64\BMRBS\srd_x64.wim
...click      Next>
```

```
(...extraction occurs...)
```

N.B. In this next step we enter path to the "base" client kit - it cannot be a patch kit:

```
...ensure     Shared Resource Tree:          W64_75
...enter      Path to NetBackup
Client...:    D:\NBU_SOFTWARE\Clients\NetBackup_Windows_x64_Client_v7.5\Symantec NetBackup
Client.msi
...click      Next>
```

```
(...extraction occurs...)
```

```
(...copying occurs...)
```

```
(...you may have to wait several minutes, do NOT hit cancel...)
```

```
...click      Finish
```

N.B. We will never add a patch kit to this first SRT...

...because it is to be used to restore clients that have never been patched, and are running only NetBackup Client v7.5

...because we want to use this "base" NetBackup Client SRT as a basis for copying to create new SRTs that will have a patched NetBackup Client.

...to view the new SRT, go back to the Admin Console - and hit F5/refresh in Bare Metal Restore Management \ Resources \ Shared Resource Trees

...now we need to copy this first ever SRT, i.e. our "Windows 64-bit fast restore plus base NetBackup v7.5 Client" SRT to a new SRT...

...and then add the latest NetBackup Client patch kit to this newly copied SRT...

...from a DOS/cmd box, start the SRT Administration Wizard:

```
bmrstrtadm
```

```
...click      Next>
```

```
...select     Copy or Import a Shared Resource Tree
```

```
...click      Next>
```

```
...select     Copy a Shared Resource Tree
```

```
...click      Next>
```

```
...select     Name:          W64_75
```

```
...enter      Name:          W64_7505
```

```
...enter      Description:    Windows 64-bit, NetBackup v7.5.0.5
```

```
...enter      Target location...: C:\SRT
```

```
...click      Next>
```

```
(...copying occurs...)
```

```
(...you may have to wait several minutes, do NOT hit cancel...)
```

```
...click      Finish
```

...now we add the NetBackup Client patch kit to the newly created copy...

...from a DOS/cmd box, start the SRT Administration Wizard:

```
bmrstrtadm
```

```
...click      Next>
```

```
...select     Add or Update Packages to a Shared Resource Tree
```

```
...click      Next>
```

(...next do NOT select "Update the version of NetBackup Client in a Shared Resource Tree" which is a step used to...

...load a new base client kit - and we don't want to do that just yet - what we want to do is add a maintenance pack...)

```
...select    Add Release Update or Maintenance Pack to a Shared Resource Tree
...click     Next>
```

N.B. be CAREFUL in this next step...

...to select the correct SRT - i.e. the copy...

...to browse to the path to the MSI of the correct patch kit:

```
...ensure    Shared Resource Tree:          W64_7505
...enter     Path to the
NetBackup...: D:\NBU_SOFTWARE\Clients\NetBackup_Windows_x64_Client_v7.5.0.5\NetBackup
Update.msi
...click     Next>
```

(...extraction occurs...)

(...copying occurs...)

(...you may have to wait several minutes, do NOT hit cancel...)

```
...click     Finish
```

9.1.6 Further Considerations

- Do you want to backup your SRTs ? Already covered by a policy ?

- If you are using traditional plain (non-MSDP) media servers to BMR themselves and you are using storage-unit-groups, then

you will likely see that the media servers like to BMR backup to themselves - which is probably not a lot of use in a non-SSO

environment - so you may want to configure backup policies of the media servers such that they backup to each other

specifically, and not to a storage-unit-group of which the media server being backed-up is a member of.

9.1.7 Configure BMR PXE Boot Interface

...needs to be run to tell BMR Boot Server which interface to listen to...

...on Windows BMR Boot Server:
bmrpxeadm

...on *n*x BMR Boot Server:
(...tbc...)

9.1.8 Open Firewall Ports for BMR

BMR PXE boot requires port 4011 incoming on BMR Boot Server

9.1.9 Testing BMR Recovery

type 1 - no change of MAC address	no change of IP address	no change of
master	no change of client name	tested

current, prepare for restore

if PXE booting:

when booting VM, wait for NIC, then press F12

during first reboot, IP details should be automatically pulled from master

after first reboot, login, then let BMR finish, answer query re shutdown, then when

prompted reboot again

type 2 - new tin, change of MAC address	same site/net, no change of IP	same domain, no change
of master	no change of client name	tested

get MAC address of correct NIC from guest VM

```

copy current to new config
in new config
    change MAC address of NIC
...then...
prepare for restore
if PXE booting:
    when booting VM, wait for NIC, then press F12
    during first reboot, IP details should be automatically pulled from master
    after first reboot, login, then let BMR finish, answer query re shutdown, then when
prompted reboot again
    if ISO booting:
        during first boot you will be asked to fill in IP details for client, gateway and master
        after first reboot, login, then let BMR finish, answer query re shutdown, then when
prompted reboot again
    after reboot of client
        amend own hosts file entry if not using A/D

type 3 - new tin, change of MAC address    diff site/net, change of IP        same domain, no change
of master    no change of client name    tested
    get MAC address of correct NIC from guest VM
    copy current to new config
    in new client config
        add hosts file entry
        change IP of required NIC
        change MAC address of NIC
        then ensure correct IP selected
    update entry for client in hosts file on master-A, master-B, and adminhost
    on all three do: bpcIntcmd -clear_host_cache
    ...then...
    prepare for restore
    when booting VM, wait for NIC, then press F12

type 4 - new tin, change of MAC address    diff site/net, change of IP        diff domain, change of
master    no change of client name

type 5 - new tin, change of MAC address    diff site/net, change of IP        diff domain, change of
master    change of client name

```

9.2 NetBackup KMS

9.2.1 Introduction

There are three methods of encryption for NetBackup:

- 1) Client side
 - (but uses CPU, very bad for de-dupe, difficult to manage)
 - (if key is lost, can be regenerated from passphrase)
- 2) KMS
 - (no additional CPU usage)
 - o NetBackup KMS using passphrases
 - (if keys are lost, can be regenerated from passphrases)
 - o NetBackup KMS using system generated keys
 - (if keys are lost, data is lost)
 - o External KMS (either HP or IBM) (only matches certain drives)
 - (if keys are lost, data is lost)
- 3) NetBackup MSEO
 - (but uses LOTS of CPU) (is this now a deprecated feature?)
 - (if keys are lost, data is lost)

9.2.2 NetBackup KMS Warning

The steps below are per NetBackup domain, i.e. this is not per media server, not per library, and

independent of tape drive hardware vendor.
 Vendor KMS for HP LTO drives is different to vendor KMS for IBM LTO tape drives.
 NetBackup KMS works with both drive manufacturers.
 You will need to think of three strong pass phrases, which the encryption algorithms will convert into keys.
 N.B. If you loose the keys, then access to data is lost...
 ...N.B. the keys are NOT saved as part of the catalog backup...
 ...but they can be re-created from the original pass phrases...
 If you forget the pass-phrases then you will never be able to regenerate the keys.
 Catalog backups to tape (when using NetBackup KMS) are normally always unencrypted (because there are usually written
 to a volume pool named "Catalog_Backup", so catalog backup media can be stored with the encrypted backup media, because
 the catalog backups only contain system and backup meta-data, and not actual business data.

A quick note about recording the key-names AND pass-phrases.

N.B. the key-name and the key itself are integral. i.e. to restore encrypted data then whilst it is obvious that the key (and thus the pass-phrase need to be known), it is not so obvious that the key-name must also exactly match (note: match exactly, so spelling, casing, and any hyphens-underscores must match exactly).

Consider this... LTO media are rated (in perfect storage conditions) to last for 20 years. Ask yourself, will your record of key-names and pass-phrases still exist in 20 years time? I recommended not printing them using ink-jet or laser printers, nor writing them down using a standard/cheap pen or biro - because all of these materials just won't last that long - the ink will fade, or in the case of laser printed text, after a few years the carbon mix will simply fall off the paper that it is printed on. You need to think about the ink that lawyers, solicitors and registrars use - i.e. a high quality permanent ink that lasts for a lifetime (75 years plus). Also consider this... Your record of key-names and pass-phrases may need to last for 20 years after the last backup is saved. For example, you may install a NetBackup environment that lasts 10 to 15 years. So, your record of key-names and pass-phrases may need to last for at least 30 to 35 years - perhaps even longer. Obviously don't save the key-names and pass-phrases on digital media, as they simply won't last either. Scary huh!?

9.2.3 Before Configuring

Tape media encryption is based around volume pools. Volume pool names are sometimes loosely associated with retention, e.g. you may have a weekly backup media pool with a retention of one month, and maybe a monthly backup volume pool with a retention of one year or longer. If you want to encrypt backups being written to a volume pool, then an encryption key group with a key-group-name exactly matching the volume pool name must be configured. However, to get NetBackup to write encrypted tape media, then the volume pool name must be the five characters "ENCR_". Thus, all encryption key-group-names must also begin with the same five characters of "ENCR_".

If, for example, you are currently saving all monthly full backups to an un-encrypted media pool named "Monthly_7Years", then to encrypt these monthly full backups then you will need to do three things:

- 1) create an encryption key-group named: ENCR_Monthly_7Years
- 2) create a new volume pool named: ENCR_Monthly_7Years
- 3) change backup/SLP policies to use the new volume pool.

9.2.4 Configuring NetBackup KMS on Appliance Master or Master/Media

FYI - NetBackup KMS is not supported on any appliance master, or appliance master/media, before v2.6.0.1.

Q) How would this be possible on v7.6.0.2, with no CLish root access ?

support / maintenance / elevate

...create the key database...

nbkms -info

nbkms -createemptydb

passphrase	my-hmk-id
passphrase	my-kpk-id

nbkms -info

nbkmsutil -gethmkid


```

nbkmsutil -getkpkid

ls -lash /usr/opensv/kms/db
ls -lash /usr/opensv/kms/key

# ...has the NetBackup KMS daemon started...
ps -ef | grep -i nbkms

# ...if not then start it with...
Use NetBackup Java Admin Console, connect to master, then browse to Activity Monitor, and Daemons
tab...
...and start the 'nbkms' daemon.

# ...create the key group - N.B. the keygroup name MUST begin with the five character string of
'ENCR_'
nbkmsutil -listkgs
nbkmsutil -createkg -kgname ENCR_data
nbkmsutil -listkgs

# ...create the key:
nbkmsutil -listkeys -kgname ENCR_data
nbkmsutil -createkey -keyname my-key -kgname ENCR_data
...will prompt for a pass phrase...
nbkmsutil -listkeys -kgname ENCR_data
nbkmsutil -modifykey -keyname my-key -kgname ENCR_data -activate
nbkmsutil -listkeys -kgname ENCR_data
nbkmsutil -ksstats

# ...create a volume pool with a name exactly matching the key group name:
vmpool -list_all -bx
vmpool -create -pn ENCR_data -description "KMS encryption"
vmpool -list_all -bx

# ...in use...
# Configure backup/SLP policy to use the new Volume group (i.e. it must begin with ENCR_).
# Do not enable "encryption" on policy - as this is for client side encryption.
# Run a test backup.
# Confirm encryption, using images on media report.

# below are the minimum steps to backup the NetBackup KMS key database:
# ...ideally amend this to copy off-host and off-site...
# ...when NetBackup KMS passphrases based keys are used...
# ...then this only needs to be run when keys are added, changed, amended...
# ...and does not need to be run after each backup session.

nbkmsutil -ksstats
nbkmsutil -quiescedb
nbkmsutil -ksstats

cp /usr/opensv/kms/db/KMS_DATA.dat /tmp
cp /usr/opensv/kms/key/KMS_HMKF.dat /tmp
cp /usr/opensv/kms/key/KMS_KPKF.dat /tmp

nbkmsutil -ksstats
nbkmsutil -unquiescedb
nbkmsutil -ksstats

exit / exit / return

```

9.2.5 Configuring NetBackup KMS on Windows

(...whilst this step isn't relevant to an appliance, they are only included here purely for reference...)

```

# ...create the key database...
nbkms -info
nbkms -createemptydb
passphrase my-hmk-id

```

```

passphrase          my-kpk-id
nbkms -info
nbkmsutil -gethmkid
nbkmsutil -getkpkid

dir "D:\Program Files\Veritas\kms\db\"
dir "D:\Program Files\Veritas\kms\key\"

# ...ensure service starts with NetBackup...
services.msc

# ...and change "NetBackup Key Management Service" to automatic and start it, then check it is
running with...
net start | find /i "NetBackup"

# ...create the key group - N.B. the keygroup name MUST begin with the five character string of
'ENCR_'
nbkmsutil -listkgs
nbkmsutil -createkg -kgname ENCR_data
nbkmsutil -listkgs

# ...create the key:
nbkmsutil -listkeys          -kgname ENCR_data
nbkmsutil -createkey -keyname my-key -kgname ENCR_data
    ...will prompt for a pass phrase...
nbkmsutil -listkeys          -kgname ENCR_data
nbkmsutil -modifykey -keyname my-key -kgname ENCR_data -activate
nbkmsutil -listkeys          -kgname ENCR_data
nbkmsutil -ksstats

# ...create a volume pool with a name exactly matching the key group name:
vmpool -list_all -bx
vmpool -create -pn ENCR_data -description "KMS encryption"
vmpool -list_all -bx

# ...in use...
# Configure backup/SLP policy to use the new Volume group (i.e. it must begin with ENCR_).
# Do not enable "encryption" on policy - as this is for client side encryption.
# Run a test backup.
# Confirm encryption, using images on media report.

# below is a simple script to backup the NetBackup KMS key database:
# ...ideally amend this to copy off-host and off-site...
# ...when NetBackup KMS passphrases based keys are used...
# ...then this only needs to be run when keys are added, changed, amended...
# ...and does not need to be run after each backup session.

@echo on
setlocal enabledelayedexpansion
nbkmsutil -quiescedb
copy "C:\Program Files\Veritas\kms\db\KMS_DATA.dat" "D:\NBU-KMS-BACKUP\KMS_DATA.dat"
copy "C:\Program Files\Veritas\kms\key\KMS_HMKF.dat" "D:\NBU-KMS-BACKUP\KMS_HMKF.dat"
copy "C:\Program Files\Veritas\kms\key\KMS_KPKF.dat" "D:\NBU-KMS-BACKUP\KMS_KPKF.dat"
nbkmsutil -unquiescedb
pause
exit /b

# to restore...
copy "D:\NBU-KMS-RESTORE\KMS_DATA.dat" "C:\Program Files\Veritas\kms\db\KMS_DATA.dat"
copy "D:\NBU-KMS-RESTORE\KMS_HMKF.dat" "C:\Program Files\Veritas\kms\key\KMS_HMKF.dat"
copy "D:\NBU-KMS-RESTORE\KMS_KPKF.dat" "C:\Program Files\Veritas\kms\key\KMS_KPKF.dat"

```

9.3 Saving Catalog Backup DR File to Another Host

9.3.1 Appliance Master Server Catalog Backup Save DR File to NFS Export on MacOSX

...tbc...

9.3.2 Appliance Master Server Catalog Backup Save DR File to NFS Share on Windows 2008 R2

- On a Windows 2008 R2 SP1 server, Server Manager, Roles, Add Role, File Services, File Server and Services for Network File System

- Reboot the Windows 2008 R2 SP1 server

- Run Windows Update several times, until no more patches are installed
(...watch out - make sure Internet Explorer 11 is not auto-installed - IF - you don't want this...)

- Reboot the Windows 2008 R2 SP1 server

- Create a folder:
C:\CATALOG-DR-FILES

- Right click folder, select Properties...
select NFS Sharing tab...
click Manage NFS Sharing...
tick Share this folder
click Permissions
change ALL MACHINES access to No Access
add the required master server names, read-write, allow root
click OK
click OK
click Apply
click OK
click Close
(...the folder itself does not need everyone:full or authenticated-users:full)

- On v2.6.0.x appliance CLIsh:
manage
mountpoints
mount win2008r2:/CATALOG-DR-FILES /mnt/remote/win2008r2 nfs
return

- In the catalog backup policy, save the DR file to:
/mnt/remote/win2008r2/mymaster

9.4 Testing Manual Replication (AIR push) from Master01 to Master02

FYI - nbreplicate is a push type command, it is issued on the master server of the source domain. nbreplicate commands can only be issued on master (master/media) servers, not on media servers.

nbreplicate requires that an SLP exists on target NetBackup domain with an 'Import' stage.

Firstly, we need the de-dupe password of the target master02...

CLIsh / Appliance / ShowDedupPassword
...which is used as '-target_pwd' in the nbreplicate command below.

...if data classification is different between source backup, and the SLP import on the target NetBackup domain, then you will need to specify the data classification of the SLP on the target domain, using the '-dc' switch...

...on master01:
nbreplicate -backupid master01_1409999999 -cn 1 -rcn 102 -slp_name SLP_AIR_from_01_to_02 -dc Silver
-v -target_sts master02 -target_user root -target_pwd ****

...after a few minutes, check on receiving master for pending imports:
nbstlutil pendimplist

...FYI - If you push/replicate a backup image that contains a BMR portion, then after import a restore job will automatically run on the receiving master to populate the BMR client details.

...have tested:

- push from MSDP on master01 to MSDP on master02 worked ok (for an image that was saved via SLP to MSDP)
- push from MSDP on master01 to MSDP on master02 worked ok (for an image that was saved straight to MSDP)
- push from MSDP on master01 to MSDP on master02 worked ok (for an image that was saved straight to adv.disk then manually duplicated to MSDP))
- push from adv.disk on master01 to MSDP on master02 failed with status 228...

...i.e: Skipping backup id master01_1409999999, fragments exist on media which does not support replication

9.5 Master Server Configuration

CLIsh / support / maintenance / elevate

...keep logs, max copies, max jobs/client:

```
bpconfig -L
bpconfig -kl 31 max_copies 2 -mj 2
bpconfig -L
```

...logging minimum:

```
echo VERBOSE=-1 | bpsetconfig
echo PEM_VERBOSE=-1 | bpsetconfig
echo JM_VERBOSE=-1 | bpsetconfig
echo RB_VERBOSE=-1 | bpsetconfig
```

...keep activity monitor logs 31 days:

```
echo KEEP_JOBS_HOURS=744 | bpsetconfig
echo KEEP_JOBS_SUCCESSFUL_HOURS=744 | bpsetconfig
```

...re-read config:

```
bprdreq -rereadconfig
```

...VxUL - Default Logging:

```
vxlogcfg -l
```

```
vxlogcfg -l | egrep -v "^List|ics" | awk '{print $1}' | while read PROD; do echo ${PROD}; sudo
vxlogcfg -l -p ${PROD} -o Default | grep -i Level; done
```

```
vxlogcfg -l | egrep -v "^List|ics" | awk '{print $1}' | while read PROD; do echo ${PROD}; sudo
vxlogcfg -a -p ${PROD} -o Default -s DebugLevel=0; done
vxlogcfg -l | egrep -v "^List|ics" | awk '{print $1}' | while read PROD; do echo ${PROD}; sudo
vxlogcfg -a -p ${PROD} -o Default -s DiagnosticLevel=0; done
```

```
vxlogcfg -l | egrep -v "^List|ics" | awk '{print $1}' | while read PROD; do echo ${PROD}; sudo
vxlogcfg -l -p ${PROD} -o Default | grep -i Level; done
```

...VxUL - Check for Non-Zero Logging Levels for NetBackup:

```
vxlogcfg -l -p 51216 | egrep -v "^List" | awk '{print $1}' | while read OID; do echo ${OID}; sudo
vxlogcfg -l -p 51216 -o ${OID} | egrep -i "Level" | egrep -v "Level = 0"; done
```

...VxUL - Check for, and Remove, Non-Zero Logging Levels for 'nbappwebsevice':

```
vxlogcfg -l -p 58991 | egrep -v "^List|^Default"
```

```
vxlogcfg -l -p 58991 | egrep -v "^List|^Default" | awk '{print $1}' | while read OID; do echo
${OID}; sudo vxlogcfg -l -p 58991 -o ${OID} | egrep -i "Level" | egrep -v "Level = 0"; done
```

```
vxlogcfg -l -p 58991 | egrep -v "^List|^Default" | awk '{print $1}' | while read OID; do echo
${OID}; sudo vxlogcfg -p 58991 -o ${OID} -r -s DebugLevel; done
```

```
vxlogcfg -l -p 58991 | egrep -v "^List|^Default" | awk '{print $1}' | while read OID; do echo
```

```
${OID}; sudo vxlogcfg -p 58991 -o ${OID} -r -s DiagnosticLevel; done
```

```
vxlogcfg -l -p 58991 | egrep -v "^List|^Default" | awk '{print $1}' | while read OID; do echo  
${OID}; sudo vxlogcfg -l -p 58991 -o ${OID} | egrep -i "Level" | egrep -v "Level = 0"; done
```

9.6 Setup Mac OSX 10.9.4 As SMTP Relay Host

These notes were pulled together from:

<http://blog.anupamsg.me/2012/02/14/enabling-postfix-for-outbound-relay-via-gmail-on-os-x-lion-11/>

9.6.1 Update The Launch Config File

```
$ cd /System/Library/LaunchDaemons  
$ sudo cp org.postfix.master.plist org.postfix.master.plist.orig  
$ sudo vim /System/Library/LaunchDaemons/org.postfix.master.plist
```

...and just before the end of the file, add these two lines...

```
<key>OnDemand</key>  
<true/>
```

...i.e. add the two lines above just before these last two lines...

```
</dict>  
</plist>
```

<esc>:wq!

9.6.2 Edit The File: /etc/postfix/main.cf

```
$ cd /etc/postfix  
$ sudo cp main.cf main.cf.orig
```

...add the following lines to the end of the file...

```
$ sudo vim main.cf
```

```
relayhost = [mail.btinternet.com]:587  
smtp_sasl_auth_enable=yes  
smtp_sasl_password_maps=hash:/etc/postfix/sasl/passwd  
smtp_sasl_security_options = noanonymous  
smtp_generic_maps = regexp:/etc/postfix/rewrite
```

<esc>:wq!

...now re-edit the file and near the end of the file just before our new entries...

...add: , 10.0.9.0/24 to the line mynetworks = ...

...and change the inet_interfaces line to be:

```
inet_interfaces = localhost, vmhost
```

9.6.3 Create The File: /etc/postfix/rewrite

```
$ sudo vim /etc/postfixrewrite  
./ */ myemail@myisp.com
```

<esc>:wq!

9.6.4 Edit The File: /etc/postfix/aliases

```
$ cd /etc/postfix  
$ whoami  
$ sudo cp aliases aliases.orig
```

...in the file, next we will uncomment the line:

```
#root: you
```

...and make it:

```
$ sudo vim aliases
root: myusername
```

```
<esc>:wq!
```

```
...and don't forget to run...
$ sudo newaliases
```

9.6.5 Create The File: /etc/postfix/sasl/passwd

```
$ sudo mkdir -p /etc/postfix/sasl
$ cd /etc/postfix/sasl
$ sudo vim passwd
[mail.btinternet.com]:587 mailusername:mailpassword
```

```
<esc>:wq!
```

```
...and don't forget to run...
$ sudo postmap passwd
```

9.6.6 Reload The Launch Config

```
$ sudo launchctl unload -w /System/Library/LaunchDaemons/org.postfix.master.plist
$ sudo launchctl load -w /System/Library/LaunchDaemons/org.postfix.master.plist
```

9.6.7 Test Sending Mail

```
$ cd ~
$ mail myself
test1
test1
<ctrl>-D
```

9.6.8 Check The Log

```
$ tail -f /var/log/mail.log
```

9.6.9 Notes

The config above will re-direct all email coming through the relay to one account. If you want emails to actually go to their intended target then...

```
...change the main.cf line...
$ sudo vim /etc/postfix/main.cf
smtp_generic_maps = hash:/etc/postfix/generic
<esc>:wq!
```

```
...create a generic mapping file...
$ sudo vim /etc/postfix/generic
myuser@myhost myemail@myisp.com
@myhost myemail@myisp.com
<esc>:wq!
```

```
...and don't forget to run...
$ sudo postmap generic
```

```
...stop and restart the postfix SMTP daemon...
$ sudo postfix stop
$ sudo postfix start
```

9.7 Update Client Packages in Appliance Master

```
...on appliance:
Manage > Software > Share Open
```

```

...on admin host:
net use m:\ m.m.m.m:\inst\patch\incoming **** /user:admin

copy SYMC_NBAPP_addon_nbwin-7.6.x.x-SLES11.x86_64.rpm M:\

net use m: /delete

...on appliance:
Manage > Software > Share Close

Manage > Software > List Downloaded

Manage > Software > Install SYMC_NBAPP_addon_nbwin-7.6.x.x-SLES11.x86_64.rpm
e.g.
  Do you want to proceed with the installation of this addon?(yes/no)yes
  Acquiring appliance exclusive lock ... ok
  Checking the add-on 'SYMC_NBAPP_addon_nbwin-7.6.0.2-SLES11.x86_64.rpm' ... ok
  Checking whether the add-on is already installed ... no
  Proceeding to install the update ... ok
  - [Warning] No recipients are configured to receive software notifications.
    Use 'Settings->Alerts->Email Software Add' command to configure the appropriate Email
address.
  - [Info] Successfully installed the add-on SYMC_NBAPP_addon_nbwin-7.6.0.2-
SLES11.x86_64.rpm.

```

9.8 VADP - VMware Backups

For non-AD testing
 Create a hosts file entry on master, and admin console host

```

10.0.9.x      esxhost.localdomain      esxhost

```

...then you will be able to add credentials for a VMhost named:

```

esxhost.localdomain

```

(...tbc...)

10 Partial Incomplete Notes

Do not use these notes for anything - they are just a jumble of odds and ends.

10.1 Example Routing from a Fresh v1.4.2 Install

```
# ip route list
192.168.1.0/24 dev eth0 proto kernel scope link src 192.168.1.1
10.2.0.0/16 dev eth1 proto kernel scope link src 10.2.8.190
169.254.0.0/16 dev eth0 scope link
127.0.0.0/8 dev lo scope link
default via 10.2.0.254 dev eth1
```

10.2 Example Fix Routing on a v1.4.2 After Bonding/Addressing Changes

```
NB5020:
# route
# ip route list
# ip route del 10.2.8.0/24
# ip route add 10.2.0.0/16 dev eth1 proto kernel scope link src 10.2.8.107
# ip route add default via 10.2.0.254 dev eth1
```

```
NB5220:
# route
# ip route list
# ip route del 10.0.9.0/24
# ip route add 10.0.9.0/24 dev eth1 proto kernel scope link src 10.0.9.10
# ip route add default via 10.0.9.1 dev eth1
```

10.3 Bonding on NB50x0

```
# now enable bonding...
# >>> NO DON'T DO BONDNG YET - HAVEN'T GOT THIS TO WORK YET...
network
config show
bonding show
bonding enable 10.0.9.12 bond0 balance-alb 10.0.9.12 255.255.255.0 eth0 eth1 eth2 eth3
bonding show
config show
exit
```

10.4 Ubuntu Application Management

```
# to search currently installed packages...
dpkg --get-selections | grep package

# to search, show, list, for a package...
sudo apt-cache show package
sudo apt-cache depends package
sudo apt-file search package
sudo apt-file list package

# to download source for a package...
sudo apt-get source package

# to pull down everything else that a package needs to be built...
sudo apt-get build-dep package

# to auto-build a package after downloading...
sudo apt-get -b source package
```

10.5 Configure L2TP/IPsec Server

```
# From: http://www.slsmk.com/setup-l2tp-ipsec-vpn-on-ubuntu/
```



```
# for openswan to function correctly, you need to run to following at the bash prompt...
sudo su -
for each in /proc/sys/net/ipv4/conf/*
do
    echo 0 > $each/accept_redirects
    echo 0 > $each/send_redirects
done
echo 1 > /proc/sys/net/ipv4/ip_forward
exit

# restart ipsec...
sudo /etc/init.d/ipsec restart

# does ipsec think it is configured ok...
sudo ipsec verify

# check L2TP...
blah blah blah - see the link above...
```

10.6 Configure L2TP/IPsec Client

```
sudo apt-get install blah...
(...tbc...)
```

10.7 Refresh DHCP

```
ifconfig
sudo dhclient eth0
ifconfig
```

10.8 Harden SSH on ubuntu

You want to harden it from the standard setup. There are several suggestions here :
<http://askubuntu.com/questions/2271/how-to-harden-an-ssh-server>
 ...but at the least, I suggest:
 Use key-based logins. Disable password logins
 Move it off port 22. Use something crazy-high, in the 20000-60000 range.
 Use fail2ban to ban people who do find it and try to brute it

10.9 If A Disk Image Appears Corrupt

```
# on Ubuntu, one could try setting up a loop back device, and running a file system check, and then
retry mount, e.g...
losetup --offset 4128768 /dev/loop9 NB5xxx-v9.9.9.img
fsck /dev/loop9
mount /dev/loop9 /media/loop9
```

10.10 Example Path Export for Unix/Linux Master/Media Servers

```
# for NetBackup...
PATH=${PATH}:/usr/opensv/netbackup/bin
PATH=${PATH}:/usr/opensv/netbackup/bin/admincmd
PATH=${PATH}:/usr/opensv/netbackup/bin/goodies
PATH=${PATH}:/usr/opensv/netbackup/bin/support
PATH=${PATH}:/usr/opensv/pdde
PATH=${PATH}:/usr/opensv/volmgr/bin
PATH=${PATH}:/opt/VRTSpx/bin
# for Solaris...
PATH=${PATH}:/usr/local/bin
PATH=${PATH}:/usr/sbin
PATH=${PATH}:/opt/sfw/bin
# now export...
export PATH
```

>>> NetBackup EMM database admin binaries too? Probably a good idea not to.

[end]