Idiot's Guide to running DSM 4.2 on ESXi 5.1

Required:

A bit of time to accurately follow this guide, comprehension and configuration skills.

A properly installed and configured 64-Bit Machine running ESXi 5.1: https://my.vmware.com/web/vmware/evalcenter?p=free-esxi5&lp=default Installation and Configuration of ESXi 5.1 is left as an exercise for the reader.

NOTE: It is not a requirement to support Vt-d and use VMDirectPath I/O for disks. Use this configuration only if performance is critical and absolutely necessary. Using the PVSCSI controller and creating physical RDM mapped disks is preferred. Using a Datastore mapped VMDK (as in this guide) is for instructional and testing purposes only, and should not be used in a normal usage environment. Thin Provisioned VMDKs can be used for testing & evaluation, but performance will suffer as a result.

Download the modified Synology DSM 4.2 from here: http://yadi.sk/d/fTRkFMyU3D8Yc (Thanks to jukolaut, based on odie82544's DS3612xs_3202-Repack images)

Download the Synology Assistant from Synology directly: http://www.synology.com/support/download.php?lang=enu&b=12%20bays&m=DS3612xs

ESXi Preparation:

Upload the esxi_synoboot_3202_v2.vmdk disk image to your ESXi Datastore. Place it in a useful directory. i.e.: pre-create a directory with the same name you will give your Synology Virtual Machine instance, and upload this file into that directory.

VM Configuration:

Create a new Custom Virtual Machine

Create New Virtual Mac	hine	- 7 🛛
Configuration Select the configuration f	or the virtual machine	
Configuration Name and Location Storage Virtual Machine Version Guest Operating System CPUs Memory Network SCSI Controller Select a Disk Ready to Complete	Configuration Typical Create a new virtual machine with the most common devices and configuration options. Create a virtual machine with additional devices or specific configuration options.	
Help	<u>≤Back</u> Next ≥	Cancel

🚱 Create New Virtual Machine

Name and Location

Specify a name and location for this virtual machine

Configuration	Name:
Name and Location	Synology_ESXi
Storage Virtual Machine Version Guest Operating System CPUs Memory Network SCSI Controller Select a Disk Ready to Complete	JSynology_ESXi Virtual machine (VM) names may contain up to 80 characters and they must be unique within each vCenter Server VM folder. VM folders are not viewable when connected directly to a host. To view VM folders and specify a location for this VM, connect to the vCenter Server.
Help	<u>≤ Back</u> Cancel

Put it on your ESXi Datastore - Using a SSD is good

🕑 Create New Virtual Machine	

Storage

Select a destination storage for the virtual machine files

Location	Name	Drive Type	Capacity Provis	sioned	Free	Туре	Thin Provisioning	Acces
Version	Datastore	SSD	74.50 GB 63.63	GB	12.73 GB	VMFS5	Supported	Single
n								
	COMM (10						1	1947
	Disable Storage Select a datastore:	DRS for this virtual n	nachine					>
	C Disable Storage Select a datastore: Name	DRS for this virtual n	iii nachine Capacity Provision	red	Free	Туре	Thin Provisioning	Acc
	Disable Storage Select a datastore: Name	DRS for this virtual n	ui nachine Capacity Provision	red	Free	Туре	Thin Provisioning	Acc
	Disable Storage Select a datastore: Name	DRS for this virtual n	iii nachine Capacity Provision	ned	Free	Туре	Thin Provisioning	Acc
	Disable Storage Select a datastore: Name	DRS for this virtual n	ui nachine Capacity Provision	ted	Free	Туре	Thin Provisioning	Acc
	Disable Storage Select a datastore: Name	DRS for this virtual n	iii nachine Capacity Provision	ned	Free	Туре	Thin Provisioning	Acc
	Disable Storage Select a datastore: Name	DRS for this virtual n	ui nachine Capacity Provision	ied	Free	Туре	Thin Provisioning	Acc



🕼 Create New Virtual Machine

Virtual Machine Version

Configuration Name and Location Storage Virtual Machine Version Guest Operating System CPUs Memory Network SCSI Controller Select a Disk Ready to Complete	Virtual Machine Version This host or duster supports more than one VMware virtual machine version. Specify the virtual machine version to use. Virtual Machine Version: 7 This version will run on VMware ESX/ESXi 4.0 and later. This version is recommended when sharing storage or virtual machines with ESX/ESXi up to 4.1. Virtual Machine Version: 8 This version will run on VMware ESX 5.0 and later. Choose this version if you need the latest virtual machine features and do not need to migrate to ESX/ESXi 4.
Help	≤ Back Next ≥ Cancel

Synology DSM 4.2 is based on a Linux 2.6.x 64-Bit Kernel

Create New Virtual Mach	ne	
Guest Operating System Specify the guest operating	system to use with this virtual machine	Virtual Machine Version: 8
Configuration Name and Location Storage Virtual Machine Version Guest Operating System CPUs Memory Network SCSI Controller Select a Disk Ready to Complete	Guest Operating System: © Windows © Linux © Other <u>Version:</u> Other 2.6.x Linux (64-bit) Identifying the guest operating system here allows the wizard to pro- system installation.	vide the appropriate defaults for the operating
Help		≤Back Next ≥ Cancel





Assign 1Gb or more of memory. NOTE: It is recommended to reserve this memory for performance reasons, so the memory used MUST be available on the ESXi server.

Memory Configure the virtual ma	chine's memory size.	Virtual Machine Version:
Configuration Name and Location Storage Virtual Machine Version Guest Operating System CPUs Memory Network SCSI Controller Select a Disk Ready to Complete	Memory Configuration 1011 GB 512 GB 256 GB 128 GB 64 GB 2 GB 64 GB 2 GB 1 G	
Help	≤Back	Next > Cancel

Create 1 network adapter, VM Network, VMXNET 3, Connected at Power On

Network Which network connection	s will be used by the virtual machine?			Virtual I	Machine Version
Configuration Name and Location Storage Virtual Machine Version Guest Operating System CPUs Memory Metwork SCSI Controller Select a Disk Ready to Complete	Create Network Connections How many NICs do you want to connect? Network NIC 1: VM Network If supported by this virtual machine vers	1 •	Adapter VMXNET 3	Connect at Power On	

Adapter choice can affect both networking performance and migration compatibility. Consult the VMware KnowledgeBase for more information on choosing among the network adapters

< Back

Next >

Cancel

supported for various guest operating systems and hosts.

Use a VMware Paravirtual SCSI controller

Help

Create New Virtual Mac	hine		
SCSI Controller Which SCSI controller type would you like to use?		Virtual Machine Version	
Configuration Name and Location Storage Virtual Machine Version Guest Operating System CPUs Memory Network SCSI Controller Select a Disk Ready to Complete	SCSI controller © BusLogic Parallel (not recommended for this guest OS) © LSI Logic Parallel © LSI Logic SAS © VMware Paravirtual		
Help		≤Back Next ≥ Cancel	



Select the esxi_synoboot_3202_v2.vmdk image uploaded earlier to the Datastore

🖉 Create New Virtual Mac	hine	
Select Existing Disk Which existing disk do you	want to use as this virtual disk?	Virtual Machine Version: 8
Configuration Name and Location Storage Virtual Machine Version Guest Operating System CPUs Memory Network SCSI Controller Select a Disk Select Existing Disk Advanced Options Ready to Complete	Disk File Path [Datastore] Synology/esxi_synoboot_3202_v2.vmdk Browse	
Help	<u></u> <u>≤</u> Bac	k Next ≥ Cancel

Create New Virtual Machine
 Advanced Options
 These advanced options do not usually need to be changed.
 Virtual Machine Version: 8

Configuration Name and Location Storage Virtual Machine Version Guest Operating System	Specify the advanced options for this virtual disk. These options do not normally need to be changed. Virtual Device Node IDE (0:0)		
Memory Network SCSI Controller Select a Disk Select Existing Disk Advanced Options Ready to Complete	Mode Independent Independent disks are not affected by snapshots. Persistent Changes are immediately and permanently written to the disk. Nonpersistent Changes to this disk are discarded when you power off or revert to the snapshot.		
Help	Sack	Next >	Cancel

Select "Edit the virtual machine settings before completion" and continue

🚱 Create New Virtual Machine	
Ready to Complete	Virtual Machine Version: 8

Click Finish to start a task that will create the new virtual machine

Configuration	Settings for the new virtual machi	ine:
Name and Location	Name:	Synology_ESXi
Storage Virtual Machine Version	Host/Cluster:	stormcat.iSolutions.local
Guest Operating System	Datastore:	Datastore
CPUs	Guest OS:	Other 2.6.x Linux (64-bit)
Memory	CPUs:	2
Network	Memory:	1024 MB
SCSI Controller	NICs:	1
Select a Disk	NIC 1 Network:	VM Network
Select Existing Disk	NIC 1 Type:	VMXNET 3
Advanced Options	SCSI Controller:	VMware Paravirtual
Ready to complete	Create disk:	Use existing disk
	Virtual Device Node:	IDE (0:0)
	Disk file path:	[Datastore] Synology/esxi_synoboot_3202_v2.vmdk
	Disk mode:	Persistent
	Edit the virtual machine settin	ngs before completion
1	Creation of the virtual machinguest OS on the VM after creation	ine (VM) does not include automatic installation of the guest operating system. Install a eating the VM.
Help		<u>≤</u> Back Continue Cancel

Now we will add at least one new Hard Disk, or multiple Disks to the VM, which will become your new Synology Data Drives. NOTE: Refer to the appendix for local RDM VMDK creation.

🕼 Synology_ESXi - Virtual Mac	chine Properties	
Hardware Options Resources		
Show All Devices	Add Remove	Memory Configuration 1011 GB ▲ Memory Size: 1 + GB ▼
Hardware	Summary	512 GB
Memory (adding)	1024 MB	256 GB duest OS: 1011 GB.
 CPUs (adding) Video card (adding) VMCI device (adding) New CD/DVD (adding) New Floppy (adding) New NIC (adding) New Hard Disk (adding) 	2 Video card Restricted Client Device Client Device VM Network Virtual Disk	128 GB Maximum recommended for best performance: 8084 MB. 64 GB Default recommended for this guest OS: 1 GB. 16 GB Minimum recommended for this guest OS: 64 MB. 8 GB Minimum recommended for this guest OS: 64 MB. 1 GB Minimum recommended for this guest OS: 64 MB. 1 GB Minimum recommended for this guest OS: 64 MB. 1 GB Minimum recommended for this guest OS: 64 MB. 1 GB Minimum recommended for this guest OS: 64 MB. 1 GB Minimum recommended for this guest OS: 64 MB. 1 GB Minimum recommended for this guest OS: 64 MB. 1 GB Minimum recommended for this guest OS: 64 MB. 1 GB Minimum recommended for this guest OS: 64 MB. 1 GB Minimum recommended for this guest OS: 64 MB. 1 GB Minimum recommended for this guest OS: 64 MB. 1 GB Minimum recommended for this guest OS: 64 MB. 1 GB Minimum recommended for this guest OS: 64 MB. 1 GB Minimum recommended for this guest OS: 64 MB. 1 GB Minimum recommended for this guest OS: 64 MB. 1 GB Minimum recommended for this guest OS: 64 MB. 1 GB Minimum recommended for this guest OS: 64 MB. 1 GB </th
Help		FinishCancel

Choose a Hard Disk device to be added

🖉 Synology_f	ESXi - Virtual Machine Pi	roperties		- - X
Hardware Op	🖉 Add Hardware			X
F Show Al Hardware	Device Type What sort of device do	you wish to add to your virtual machin	e?	GB 💌 his
CPUs (; Video c VMCI d New C New F New N New N	Device Type Select a Disk Create a Disk Advanced Options Ready to Complete	Choose the type of device you w Serial Port Parallel Port Floppy Drive CD/DVD Drive USB Controller USB Device (unavailable) PCI Device Ethernet Adapter Hard Disk SCSI Device	vish to add. Information This device can be added to this Virtual Machine.	est ; is
Help	Help		Sack Cancel	Cancel

In this example we will create a new VMFS virtual disk on the Datastore solely for testing. In a proper environment, use a PVSCSI attached RDM, or a VMDirectPath I/O attached drive.



We will now (for example purposes only) create a 20Gb, Thick Provisioned Lazy Zeroed drive. NOTE: A Thin Provisioned drive will also work, however the performance will be even worse.

🖉 Synology	ESXi - Virtual Machine Properties	X
Hardware Op	🕼 Add Hardware	
Hardware	Create a Disk Specify the virtual disk size and provisioning policy	GB 💌
CPUs (; Video c VMCI d New C New F New N New H	Device Type Select a Disk Create a Disk Advanced Options Ready to Complete Disk Provision Lazy Zeroed Thick Provision Eager Zeroed Thin Provision Location Store with the virtual machine Specify a datastore or datastore duster: Browse	est ; is
<u>H</u> elp	<u>H</u> elp <u>≤ Back</u> <u>Next ></u> Cancel	Cancel

Attach this new disk to the SCSI (0:0) Virtual Device Node (Disk 1 in the Synology)

🕼 Synology	ESXi - Virtual Machine Properties	- 7 🗙
Hardware Op	🛿 Add Hardware	
Hardware	Advanced Options These advanced options do not usually need to be changed.	GB 💌
CPUs (; Video c VMCI d New C New F New N New N	Device Type Specify the advanced options for this virtual disk. These options do not normally need to be changed. Create a Disk Advanced Options Ready to Complete Image: ScSI (0:0) Image: Mode Image: SecIeve to the text of the text of the text of text o	est s
Help	Help	Cancel

Double-check that everything is as you want it to be, and Finish to create your storage disk. NOTE: Repeat adding disks until you have added all the drives you wish to utilise.

🕑 Syn	nology_	ESXi - Virtual Machine Pro	operties				- ª 🗙
Hardwa	are Op	🚱 Add Hardware					
Hardv	how Al vare Memor	Ready to Complete Review the selected opt	ions and click Finish to add	the hardware.			GB 💌
	CPUs (i Video c VMCI d New C New F New N New H	Device Type Select a Disk Create a Disk Advanced Options Ready to Complete	Options: Hardware type: Create disk: Disk capacity: Disk provisioning: Datastore: Virtual Device Node: Disk mode:	Hard Disk New virtual disk 20 GB Thick Provision Lazy Zer Datastore SCSI (0:0) Persistent	roed		est ; is
<u>H</u>	elp	Help				Cancel	Cancel

Now ensure that the Synology VM has all of it's memory reserved for the guest. We are (at present) not running VMTools, so memory management is best left pre-allocated. Additionally, this will permit the VM to use Vt-d attached PCI devices, and therefore to use VMDirectPath I/O and physically attached drives.

🛿 Synology_ESXi - Virtua	I Machine Properties	
Hardware Options Resource	S	
Settings	Summary	Resource Allocation
CPU	0 MHz	
Memory	0 MB	Reserve all guest memory (All locked)
Disk	Normal	
Advanced CPU	Unspecified	Shares: Normal 10240
		Reservation:
		Limit: J 5743 🛄 MB
		Unlimited
		▲ Limit based on parent resource pool or current host
Help		Einish Cancel

Click Finish, and you're now ready to start up your VM and get DSM 4.2 installed.

When you start the VM, the console will show a standard Linux boot sequence. Once completed, the login prompt will appear and you will notice a number of synobios_ioctl messages in the console window. These can be ignored.

Once the Synology OS is loaded (DSM 4.2 installed through the Synology Assistant) and configured the synobios_ioctl messages in the console will slow down in frequency.

(SYNOIO_GET_HW_CAPABILITY, SYNOIO_GET_MODULE_TYPE, SYNOIO_GET_SYS_STATUS)

RDM Disk VMDK File Preparation

Instead of creating a Virtual Disk on the VMFS filesystem which will have bad performance characteristics for a file server, it is recommended to create a physically mapped drive using a RDM (Raw Device Mapping) file, which will give near-direct access through to the disk, especially when using the PVSCSI controller.

First, we need to enable SSH on the ESXi installation in order to execute commands in the Maintenance Shell.

Reference:http://kb.vmware.com/selfservice/microsites/search.do?cmd=displayKC&docType=kc&d ocTypeID=DT_KB_1_1&externalId=1017910

Then use any SSH client, in order to connect to your ESXi Command Maintenance Shell.

NOTE: Instead of immediately adding an additional drive to the VM, first Finish creating the VM (but do not start it). This will create the VM Directory on the Datastore, into which you can then create the new RDM VMDK files for your disks.

Change directory to the location of your Synology VM Store, since we wish to create the RDM VMDK file in a useful spot - i.e. located with the Virtual Machine.

Use vSphere to figure out the path, or TAB completion in the shell to get to the right place.

i.e.: cd /vmfs/volumes/Datastore/Synology_ESXi/

Creating a RDM VMDK: Reference:http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=display KC&externalId=1026256

For the "idiot's guide" to creating local SATA RDM VMDK files, read this: Reference: http://vm-help.com/esx40i/SATA RDMs.php

It is important that you ensure you pick the CORRECT disk when specifying the disk device identifier to vmkfstools. Mapping your Datastore would be disasterous!

i.e.: vmkfstools -z /vmfs/devices/disks/vml.01000000020202020202020202020203951473358423
630535433353030 RDM1.vmdk -a lsilogic

NOTE: It is critical that when using ESXi 5.1 with large disks > 2TB, the we always use the -z switch instead of -r to create a physical RDM mapping.

Reference: http://blogs.vmware.com/vsphere/2011/07/new-vsphere-50-storage-features-part-1-vmfs-5.html

If you have the ability to utilise Vt-d and VMDirectPath I/O, then assign the Synology supported PCI SATA card directly to the VM, restart Synology DSM, and you will then have the drives directly available. within the Synology OS

In my informal testing, using the PVSCSI and Physical RDM vmdk files provides near-equivalent performance as VMDirectPath I/O. Only use this configuration if performance is critical.

Installing DSM 4.2 in Synology Virtual Machine

Run the Synology Assistant and let it scan your Network for your new Synology VM.

Synology Assis	stant								3 🗙
Management Resource Monitor Photo Uploader Printer Device								Synology	
९ Search 🖁	Connect 🛛 🗮 Map Driv	ve 🕐 Set Up	WOL					s 😜	0
Server name	IP address	IP status	Status	MAC address	Version	Model	Serial no	WOL status	
DiskStation	192.168.193.102	DHCP	Not installed	00:11:32:08:D6:2A	4.2-3202	DS3612xs	B5JDN00000		

 30%	Total 1 Synology server(s) found.

When it has been found, select it and Connect. A new web browser window will open.

© Synology Assistant										×
Management Resource Monitor Photo Uploader Printer Device Synolo								Synology		
ৎ Search 🖁 Connect 🛱 Map Drive 🕐 Set Up WOL 🕸 😧 🚯										
Server name	*	IP address	IP status	Status	MAC address	Version	Model	Serial no	WOL status	
DiskStation		192.168.193.102	DHCP	Not installed	00:11:32:08:D6:2A	4.2-3202	DS3612xs	B5JDN00000	-	

Total 1 Synology server(s) found.

You will now see the Synology Web Assistant Loading



Once loaded, you will be welcomed to your new Synology Diskstation



Choose to Install DSM from my computer or installation disc. Select the esxi_install_3202_v2.pat file from the download.



Give your new DiskStation a secure admin password, and a suitable name.

Synology Web Assistant	×		
← → C 🗋 192.168.	193.102:5000/web_index.htm	I	± [22
(Web Assist Helping You to Con	ant nnect		Syno logy
	Enter DiskStation Please set password and :	Info server name.	
	Administrator account:	admin	
	Create password:		
	Confirm password:		
\smile	Server name:	DiskStation	
	🗹 Create a Synology Hyb	rid RAID (SHR) volume after installation (recommended)	
		Install Now	

You will then be prompted that the installation will erase all data on the attached disks



The Disk(s) will then be formatted, the DSM installation pack will be uploaded, and installed

 ← → × ☐ 192.168.193.102:5000/web_index.html ☆ ■ Web Assistant Helping You to Connect Synology Installing DiskStation Manager Your DiskStation will be ready in approximately 10 minutes. Please wait, and do not turn off the power during this procedure. 	Synology Web Assistant	× 🗖 a da anti-anti-anti-anti-anti-anti-anti-anti-	<mark> -</mark> a ×
Web Assistant Helping You to Connect Synology Installing DiskStation Manager Your DiskStation will be ready in approximately 10 minutes. Please wait, and do not turn off the power during this procedure.	\leftrightarrow \rightarrow X 🗋 192.168.1	93.102:5000/web_index.html	☆ =
Installing DiskStation Manager Your DiskStation will be ready in approximately 10 minutes. Please wait, and do not turn off the power during this procedure.	Web Assista Helping You to Cont	ant nect	Syno logy
		Installing DiskStation Manager Your DiskStation will be ready in approximately 10 minutes. Please wait, and do not turn off the power during this procedure.	
Uploading DSM installation pack		Uploading DSM installation pack	
After the installation is complete, you will see the login screen of your DiskStation. You are welcome to visit <u>www.synology.com</u> to learn more about DiskStation Manager.		After the installation is complete, you will see the login screen of your DiskStation. You are welcome to visit <u>www.synology.com</u> to learn more about DiskStation Manager.	
Uploading (18%)	Uploading (18%)		

When this is completed, the DiskStation will pause for final configuration requirements



It will then reboot with the new DSM 4.2 installed ... be patient (or watch the ESXi console)

Synology Web Assistant ×		×
← → C □ 192.168.193.102:5000/web_index.html	53	Ξ
Web Assistant Helping You to Connect	Syno logy	
Installing DiskStation Manager Your DiskStation will be ready in approximately 10 minutes. Please wait, and do not turn off the power during this procedure.		
Completing installation Completing installation: 580 seconds		
After the installation is complete, you will see the login screen of your DiskStation. You are welcome to visit <u>www.synology.com</u> to learn more about DiskStation Manager.		
····		

You now have a running DiskStation!



And it's happy for you to start using it



As usual, just complete the Wizard



And welcome to your new ESXi based Virtual Machine Synology DiskStation!

