



## **De VMware Metashell (vimsh) Nader Bekeken**

Viktor van den Berg





## Wie?

- Viktor van den Berg
  - Product Manager / Technical Trainer XTG
  - VMware Certified Instructor
  - Citrix Certified Instructor XenServer
  - Parallels Certified Instructor



## Wie?

- Xpert Training Group
  - AppSense Trainingen
  - Cisco Trainingen
  - Citrix Authorized Learning Center (CALC)
  - Microsoft Trainingen
  - Parallels Authorized Training Partner (PATP)
  - Vizioncore Training Partner
  - VMware Trainingen



## Inhoud

- Programmeer en scripting Mogelijkheden
- Scripting mogelijkheden
- Wat is “vimsh”
- Een eerste voorbeeld: networking
- Een ander voorbeeld: storage
- Real life toepassing
- Vragen...





The VMware Metashell (vimsh) is officially not supported by VMware



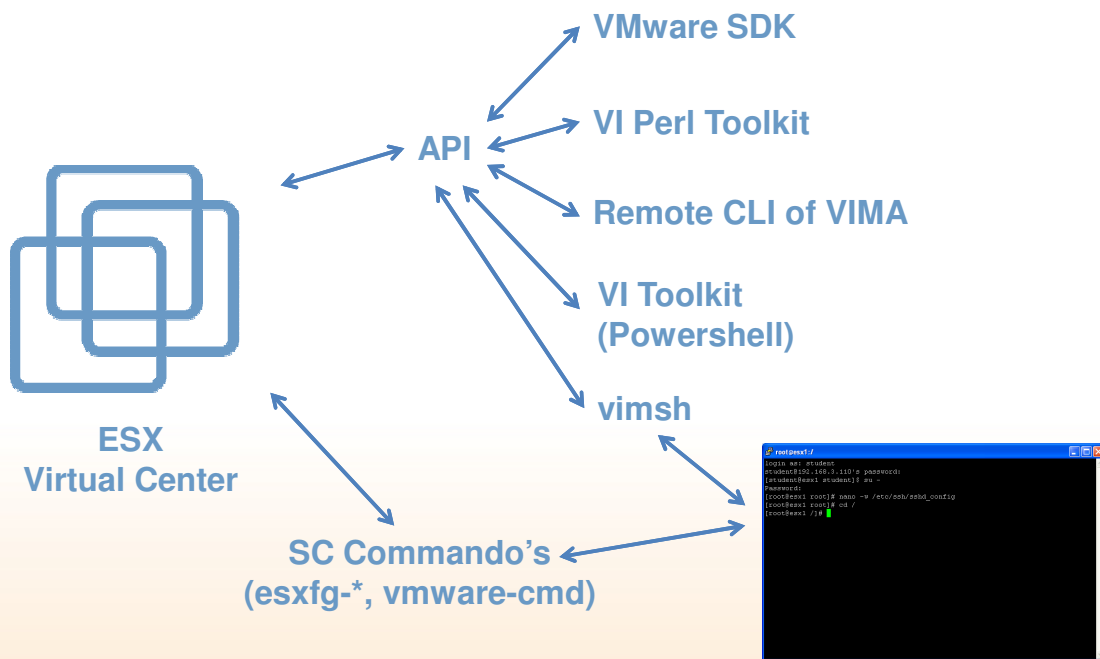
## **Programmeer en scripting mogelijkheden**



the official dutch  
**vmug**



## Scripting en programming mogelijkheden





## Wat is “vimsh”



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## De vimsh...

- ...is onderdeel van het Service Console
- ...is een interactieve shell
- ...praat tegen de API van de ESX host
- ...kun je gebruiken voor:
  - Unattended Installatie
  - Troubleshooting
  - CLI voor wat niet mogelijk is met esxcfg / overige SC commando's

```

vimsh / # ls -lh
total 15K
-rw-r--r-- 2 root root 4.0K Nov 3 11:55 010
-rw-r--r-- 4 root root 1.0K Nov 19 17:01 boot
-rw-r--r-- 22 root root 1.0K Nov 19 16:27 dev
-rw-r--r-- 32 root root 4.0K Nov 19 17:01 etc
-rw-r--r-- 3 root root 4.0K Nov 3 12:52 home
-rw-r--r-- 2 root root 4.0K Jan 25 2003 initrd
-rw-r--r-- 13 root root 6.0K Mar 19 2008 lib
-rw-r--r-- 4 root root 16K Nov 3 11:52 lost+found
-rw-r--r-- 6 root root 4.0K Nov 3 11:57 root
-rw-r--r-- 3 root root 4.0K Nov 4 13:38 opt
-rw-r--r-- 241 root root 0 Nov 19 14:12 proc
-rw-r--r-- 7 root root 4.0K Nov 3 16:02 tmp
-rw-r--r-- 5 root root 4.0K Nov 3 11:56 usr
-rw-r--r-- 16 root root 4.0K Nov 20 16:04 var
-rw-r--r-- 19 root root 4.0K Mar 18 2008 vnc
-rw-r--r-- 1 root root 1.0K Mar 15 2008 vpx
-rw-r--r-- 4 root root 51K Nov 19 15:23 vmtoolsd
-rw-r--r-- 1 root root 4.0K Nov 3 11:56 vmtoolsd

```



## Plaats van de VMware Metashell

VMware Metashell - vimsh



## Inloggen op de VMware Metashell

- Inloggen op het Service Console
- Zorg dat je root gebruiker bent
- Gebruiken van de shell:
  - `[root@esx1] vimsh`
  - `[root@esx1] vmware-vimsh`
  - `[root@esx1] vimsh -n -e`
  - `[root@esx1] vmware-vim-cmd`



## Vimsh Commands

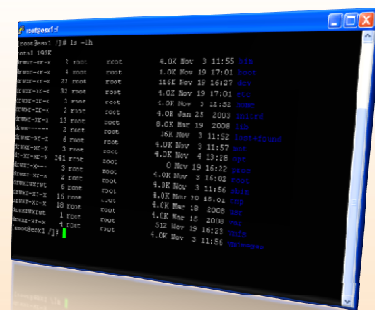
```
[root@esx1 hostd]# vimsh
```

```
[/]$ ?
```

hostsvc/	vmsvc/	csinfo	help	pupload
internalsvc/	?	cls	pinfo	puse
proxysvc/	argtype	csuimport	pload	quit
solo/	cls	echo	ploadpath	sleep
vimsvc/	csimport	exit	pls	source

Two types of commands:

- Shell commands
- Plugins





## Plugins

Plugins kunnen gevonden worden in:

- Plugins kunnen gevonden worden in:  
`/usr/lib/vmware/hostd`

Wat doen de plugins?

- `hostsvc` – Host commando's
- `internalsvc` - Refresh van ESX server
- `proxysvc` – Heeft te maken met eigen web-services
- `solo` – Registreren van VMs
- `vimsvc` – Diverse akties richting VC
- `vmsvc` - Diverse akties op VMs (i.c.m. ESX)





## Een eerste voorbeeld: Networking



the official dutch  
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## Een eerste voorbeeld

- Aanmaken virtuele switch
- Koppelen van vmnic1
- Aanmaken portgroup "production"

vimsh	esxcfg-
<pre>[root@esx1 hostd]# vimsh [/]\$ /hostsvc/net/vswitch_add vSwitch1 [/]\$ /hostsvc/net/portgroup_add vSwitch1"production" [/]\$ /hostsvc/net/vswitch_setbondbridge vSwitch1 --vsbridge-bond-pnics=vmnic1 [/]\$ /hostsvc/net/vswitch_setpolicy vSwitch1 --nicorderpolicy-active=vmnic1</pre>	<pre>[root@esx1 /]# esxcfg-vswitch --add vSwitch1 [root@esx1 /]# esxcfg-vswitch --add- pg=production vSwitch1 [root@esx1 /]# esxcfg-vswitch --link=vmnic1 vSwitch1 [root@esx1 /]# service mgmt-vmware restart</pre>



## Na "service vmware-mgt-restart"...

The screenshot shows the VMware Infrastructure Client interface. A "Connection Error" dialog box is displayed in the foreground, indicating a failure to connect to the vCenter Server. The error message reads: "The vCenter Server cannot be connected. The vCenter Server is not available." The dialog has "OK" and "Cancel" buttons.

In the background, the "Network" configuration window for a virtual machine is visible. It shows the "Network" tab with a list of network adapters. The "vNIC1" adapter is selected, and its configuration is shown, including the network name "vswan01" and the connection type "vswan01".

At the bottom of the client window, the "Recent Tasks" pane shows a list of tasks:

Name	Target	Status	Initiated By	Time	Last Time	Complete Time
Remove virtual switch	escu.cmc.crd	Completed	root	12/15/2008 1:52:57 PM	12/15/2008 1:52:57 PM	12/15/2008 1:52:57 PM



## Verschillen

vimsh	esxcfg-
De commando's worden uitgevoerd en zijn daarna direct zichtbaar in de VI Client	De commando's worden direct uitgevoerd maar zijn niet zichtbaar in de VI Client
In dit voorbeeld werd een vimsh sessie geopend, waarna de commando's uitgevoerd kunnen worden.	service mgmt-vmware restart noodzakelijk
Alles wordt gelogd in de hostd.log.	De commando's werden uitgevoerd in het Service Console vanuit de bash shell
	Niet alles wordt gelogd in o.a. hostd.log.

→ Je kunt --help geven per commando!



## Uitvoeren van de commando's

```

root@esx1:/
-D|--del-pg=name      Delete the portgroup from the virtual switch.
-C|--check-pg=name   Check to see if a portgroup exists. Program
                    outputs a 1 if it exists, 0 otherwise.
-B|--set-cdp         Set the CDP status for a given virtual switch.
                    To set pass one of "down", "listen", "advertise", "both"
-b|--get-cdp        Print the current CDP setting for this switch.
-m|--mtu=MTU       Set MTU for the vswitch. This affects all the nics attached
                    on the vswitch.
-r|--restore        Restore all virtual switches from the configuration file
                    (FOR INTERNAL USE ONLY).
-h|--help          Show this message.
[root@esx1 /]# esxcfg-vswitch --add-pg=production vSwitch2
[root@esx1 /]# esxcfg-vswitch --link=vmnic1
No virtual switch name specified
[root@esx1 /]# esxcfg-vswitch --link=vmnic1 vSwitch2
[root@esx1 /]# service mgmt-vmware restart
Stopping VMware ESX Server Management services:
  VMware ESX Server Host Agent Watchdog      [ OK ]
  VMware ESX Server Host Agent              [ OK ]
Starting VMware ESX Server Management services:
  VMware ESX Server Host Agent (background) [ OK ]
  Availability report startup (background)  [ OK ]
[root@esx1 /]#

```

```

C:\WINDOWS\system32\cmd.exe
C:\Documents and Settings\v.vandenberg\Desktop>plink 192.168.3.110 -l root -pw v
vmware -n commands.txt_

```

### Putty

- esxcfg
- vimsh
- vimsh -n -e
- vmware-vim-cmd

### Plink

- plink.exe [hostname] -l  
root -pw vmware -m  
filename.txt



## Vervolg op ons voorbeeld...

### vimsh

```
[root@esx1 hostd]# vimsh
[/]$ /hostsvc/net/vswitch_add vSwitch1
[/]$ /hostsvc/net/portgroup_add vSwitch1 "production"
[/]$ /hostsvc/net/vswitch_setbondbridge vSwitch1 --vsbridge-bond-pnics=vmnic1
[/]$ /hostsvc/net/vswitch_setpolicy vSwitch1 --nicorderpolicy-active=vmnic1
[/]$ /hostsvc/net/portgroup_add vSwitch1 vMotion
[/]$ /hostsvc/net/vnic_add --ip-address=10.0.0.110 --ip-subnet=255.255.255.0 vMotion
[/]$ /hostsvc/vmotion/netconfig_get
```



## Uitvoer /hostsvc/vmotion/netconfig\_get

### vimsh

```
vim.host.VMotionSystem.NetConfig {
  dynamicType = <unset>,
  candidateVnic = (vim.host.VirtualNic) [
    (vim.host.VirtualNic) {
      dynamicType = <unset>,
      device = "vmk1",
      key = "key-vim.host.VirtualNic-vmk1",
      portgroup = "vMotion",
      spec = (vim.host.VirtualNic.Specification) {
        dynamicType = <unset>,
        ip = (vim.host.IpConfig) {
          dynamicType = <unset>,
          dhcp = false,
          ipAddress = "10.0.0.110",
          subnetMask = "255.255.255.0",
        },
        mac = "00:50:56:74:ee:ed",
      },
    },
  ],
  .....
}
```



## Vervolg op ons voorbeeld...

### vimsh

```
[root@esx1 hostd]# vimsh
[/]$ /hostsvc/net/vswitch_add vSwitch1
[/]$ /hostsvc/net/portgroup_add vSwitch1 "production"
[/]$ /hostsvc/net/vswitch_setbondbridge vSwitch1 --vsbridge-bond-pnics=vmnic1
[/]$ /hostsvc/net/vswitch_setpolicy vSwitch1 --nicorderpolicy-active=vmnic1
[/]$ /hostsvc/net/portgroup_add vSwitch1 vMotion
[/]$ /hostsvc/net/vnic_add --ip-address=10.0.0.110 --ip-subnet=255.255.255.0 vMotion
[/]$ /hostsvc/vmotion/netconfig_get
[/]$ /hostsvc/vmotion/vnic_set vmk1
```



## Vimsh en networking

### -vswitch\_setpolicy

--securepolicy-promisc

--securepolicy-macchange

--securepolicy-forgedxmit

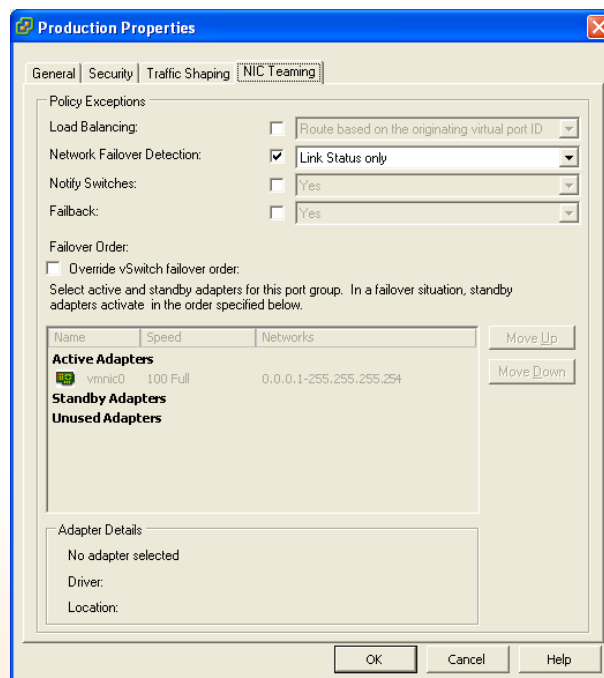
--shapingpolicy-enabled

--shapingpolicy-average-  
bandwidth

--shapingpolicy-peak-  
bandwidth

--shapingpolicy-burst-size

...



```
[/]$ /hostsvc/net/vswitch_setpolicy vSwitch2 --nicorderpolicy-  
active=vmnic1
```



## Aandachtspunten

Soms kan er geen traffic door de fysiek verzonden worden, de workaround voor dit is:

- `esxcfg -vswitch - -unlink=vmnic1`
- `esxcfg -vswitch - - link=vmnic1`

Een ander nuttig commando is:

- `/hostsvc/net/refresh`
- `/internalsvc/refresh_network`



## Een ander voorbeeld: Storage





## Storage en vimsh

Ook op het gebied van storage kan vimsh handig zijn:

```
[/]$ /hostsvc/summary/hba
```

Device	Type	Driver	PCI Id	Model
vmhba0	BlockHba	mptscsi_2xx	01:00.0	LSI1068E
vmhba1	FibreChannelHba	qla2300_707_vmw	0a:00.0	QLA2432

```
[/]$ /hostsvc/summary/fsvolume
```

Name	Type	SubType	Path	Device
esx1:storage1	VmfsVolume	VMFS	/vmfs/volumes/49269f6e-1d4a621d-2f87-001d096864a6	65229815808 readWrite
netapp_nfs_iso	NasVolume	NFS	/vmfs/volumes/db27211a-052d657a-172.16.100.201:/vol/netapp_nfs_iso	42949672960 readWrite



## Storage en vimsh

```
[/]$ /hostsvc/summary/hba
```

```
[/]$ /hostsvc/summary/hba
```

Device	Type	Driver	PCI Id	Model
vmhba0	BlockHba	mptscsi_2xx	01:00.0	LSI1068E
vmhba1	FibreChannelHba	qla2300_707_vmw	0a:00.0	QLA2432

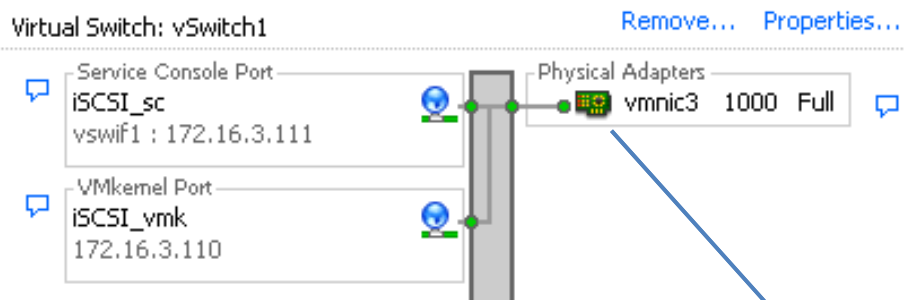
```
[/]$ /hostsvc/storage/hba_rescan vmhba1
```

```
[/]$ /hostsvc/storage/vmfs_rescan vmhba1
```

→ Is ook mogelijk met esxcfg-rescan vmhba1 ;)



## Software iSCSI



### Bij software iSCSI

- Heb je een SC port en VM Kernel port nodig
- Deze poorten moeten het storage array kunnen benaderen
- De software iSCSI initiator adapter moet geconfigureerd worden: vmhba32



**NetApp™**  
iSCSI / NFS



## iSCSI en vimsh

### iSCSI networking configureren

```
[/]$ /hostsvc/net/vswitch_add vSwitch2
[/]$ /hostsvc/net/vswitch_setbondbridge vSwitch2 --vsbridge-bond-
pnics=vmnic3
[/]$ /hostsvc/net/vswitch_setpolicy vSwitch2 --nicorderpolicy-active=vmnic3
[/]$ /hostsvc/net/portgroup_add vSwitch2 iSCSI_vmk
[/]$ /hostsvc/net/portgroup_add vSwitch2 iSCSI_sc
[/]$ /hostsvc/net/vnic_add --ip-address=172.16.3.110 --ip-
subnet=255.255.0.0 iSCSI_vmk
[/]$ /hostsvc/net/consolevnic_add --ip-address=172.16.3.111 --ip-
subnet=255.255.0.0 iSCSI_sc
```



## iSCSI en vimsh

### Nu de storage configureren

```
[/]$ /hostsvc/firewall_enable_ruleset swISCSIClient  
[/]$ /hostsvc/storage/software_iscsi_enabled true  
[/]$ /hostsvc/storage/iscsi_set_name vmhba32 iqn.2004-01.nl.xtg:demo-  
server1  
[/]$ /hostsvc/storage/iscsi_add_send_target vmhba32 172.16.100.200  
[/]$ /hostsvc/storage/iscsi_add_send_target vmhba32 172.16.100.201  
[/]$ /hostsvc/storage/hba_rescan vmhba32
```

Hierna LUNs aanmaken!



## VMFS aanmaken - vimsh

```
/hostsvc/summary/scsilun1
```

```
vmhba1:2:10 disk DGC RAID 5
02000a00006006016004de0c00413384cce5a0dd11524149442035 vmhba1
```

```
hostsvc/storage/partition_get /vmfs/devices/disks/vml.
```

```
02000a00006006016004de0c00413384cce5a0dd11524149442035
```

```
(vim.host.DiskPartitionInfo) {
  dynamicType = <unset>,
  deviceName =
"/vmfs/devices/disks/vml.02000a00006006016004de0c00413384cce5a0dd11
524149442035",
  spec = (vim.host.DiskPartitionInfo.Specification) {
    dynamicType = <unset>,
    chs = (vim.host.DiskDimensions.Chs) {
      dynamicType = <unset>,
      -----> cylinder = 1305, <-----
      head = 255,
      sector = 63,
    },
  },
}
```



## VMFS aanmaken - vimsh

```
hostsvc/storage/partition_layout_set
/vmfs/devices/disks/vml.02000a00006006016004de0c00413384cce5a0dd11
524149442035 0-1304-vmfs
```

```
hostsvc/datastore/vmfs_query_create_options
/vmfs/devices/disks/vml.02000a00006006016004de0c00413384cce5a0dd11
524149442035
```

```
(vim.host.VmfsDatastoreOption) [
  (vim.host.VmfsDatastoreOption) {
    dynamicType = <unset>,
    info = (vim.host.VmfsDatastoreOption.AllExtentInfo) {
      dynamicType = <unset>,
      layout = (vim.host.DiskPartitionInfo.Layout) {
        dynamicType = <unset>,
      }
    }
  }
..
```

```
hostsvc/datastore/vmfs_create test --partition=1 --startsector=128 --
endsector=20964824 --typeid=vmfs --logical=0
/vmfs/devices/disks/vml.02000a00006006016004de0c003f3384cce5a0dd11
524149442035 test 1Mb 3 255
```



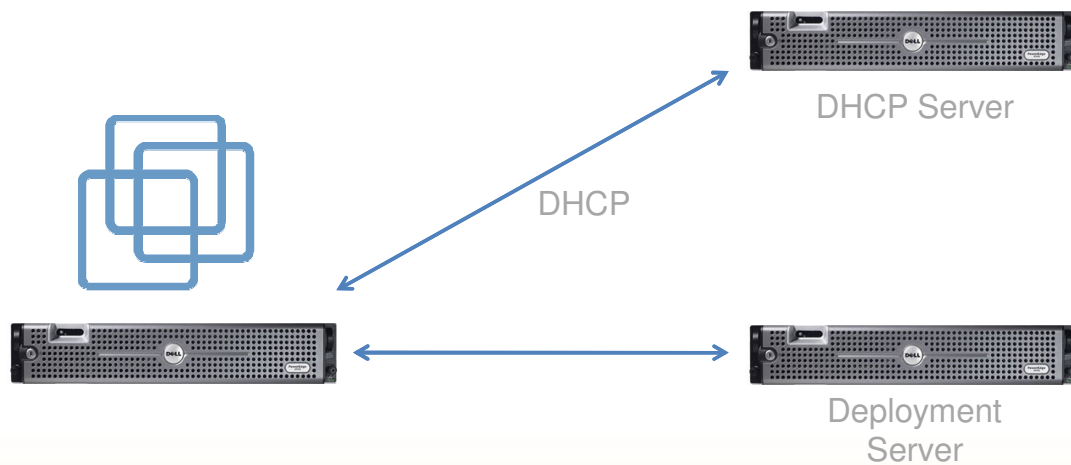
## Real life toepassing



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## PXE-boot unattended deployment



### Opties:

- Meestal wordt een volledig script gebruikt
- Ook is het mogelijk om achteraf te configuratie te pushen met plink.exe!



## Voorbeeld script

```
# Regional Settings
keyboard us
lang en_US
langsupport --default en_US
timezone Europe/Amsterdam

# Installation settings
skipx
mouse none
firewall --disabled
rootpw vmware
reboot
install
url --url http://[hostname]/esx/esx35u2/

# Driver disks

# Load drivers

# Bootloader options
bootloader --location=mbr --driveorder=sda
```



## Voorbeeld script

```
# Your postinstall script goes here!  
touch /etc/default/esxcfg.sh  
chmod 777 /etc/default/esxcfg.sh  
cat > /etc/default/esxcfg.sh << EOF  
  
#!/bin/sh  
sleep 1m  
  
echo "ADD VIRTUAL SWITCHES"  
  
/usr/bin/vimsh -n -e "hostsvc/net/vswitch_add vSwitch1"  
/usr/bin/vimsh -n -e "hostsvc/net/vswitch_add vSwitch2"  
/usr/bin/vimsh -n -e "hostsvc/net/vswitch_add vSwitch3"  
  
/usr/bin/vimsh -n -e "hostsvc/net/portgroup_add vSwitch1 Production"  
/usr/bin/vimsh -n -e "hostsvc/net/portgroup_add vSwitch2 storage_VMK"  
/usr/bin/vimsh -n -e "hostsvc/net/portgroup_add vSwitch2 iSCSI_SC"  
  
echo "PHYSICAL NETWORK CONFIGURATION"  
  
/usr/bin/vimsh -n -e "hostsvc/net/vswitch_setbondbridge vSwitch1 --vsbridge-bond-  
pnics=vmnic1"
```



## Handige links

### Vimsh:

- <http://knowledge.xtravirt.com/> (Goede vimsh whitepaper)
- <http://www.yellow-bricks.com/> (Duncan Epping)
- <http://www.l4l.be/docs/virt/vimsh.php> (Frederik Vos)

### Unattended deployment:

- <http://www.ultimatedeployment.org/> (Carl Thijssen)
- <http://www.jume.nl> (Bouke Groenescheij, removehba script)



**Zijn er vragen?**

Bedankt voor de aandacht!



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