



Network _ IP-Telefonie _ Storage _ Security _ Business Software

Herzlich Willkommen



Storage



Storage



VMWare VI3



Storage

ESX 3.0 – VC 2.0 Overview

Storage



– New

- Support of 64Bit Guest OS in VM (experimental in GA 3.0)
- 4 CPU vSMP, 16GB RAM
- Support of NAS and iSCSI
- Clusters (HA, DRS and VCB)
- License Server – License model
- Architecture changes
- Nice – Poweroff W2K3 works, RDM and SAN Boot, Silent update VM Tools
- Migration from 2.x to 3.0



Storage ESX 3 Produkte (Lizenz pro 2 Socket)

Storage



	Starter	Standard	Enterprise
ESX Server 3	x • NAS or local storage • Limited to servers with – up to 4PCPU – up to 8GB physical memory	x	x
VC Agent	x	x	x
VMFS		x	x
VSMP		x	x
VMotion			x
HA			x
DRS			x
Consolidated Backup			x
Target Market	SMB / Branch offices / Depts		



Storage

Virtual Infrastructure (VI) Produkte

Storage



Name	Lizenz
VMware VirtualCenter Management Server	Per Server
VMware VMotion	
VMware HA	Per 2 Sockets
VMware DRS	
VMware Consolidated Backup	



Storage

Update VIN 2 nach VI 3

Storage



2.x Pricing

ESX 2.x VIN

- ESX 2.x
- VSMP
- VC Agent
- VMotion

€0,00

3.x Pricing

VMware Infrastructure 3 Standard

- ESX 3
- VMFS
- VSMP
- VC Agent

- VMotion

For customers with valid SnS contracts



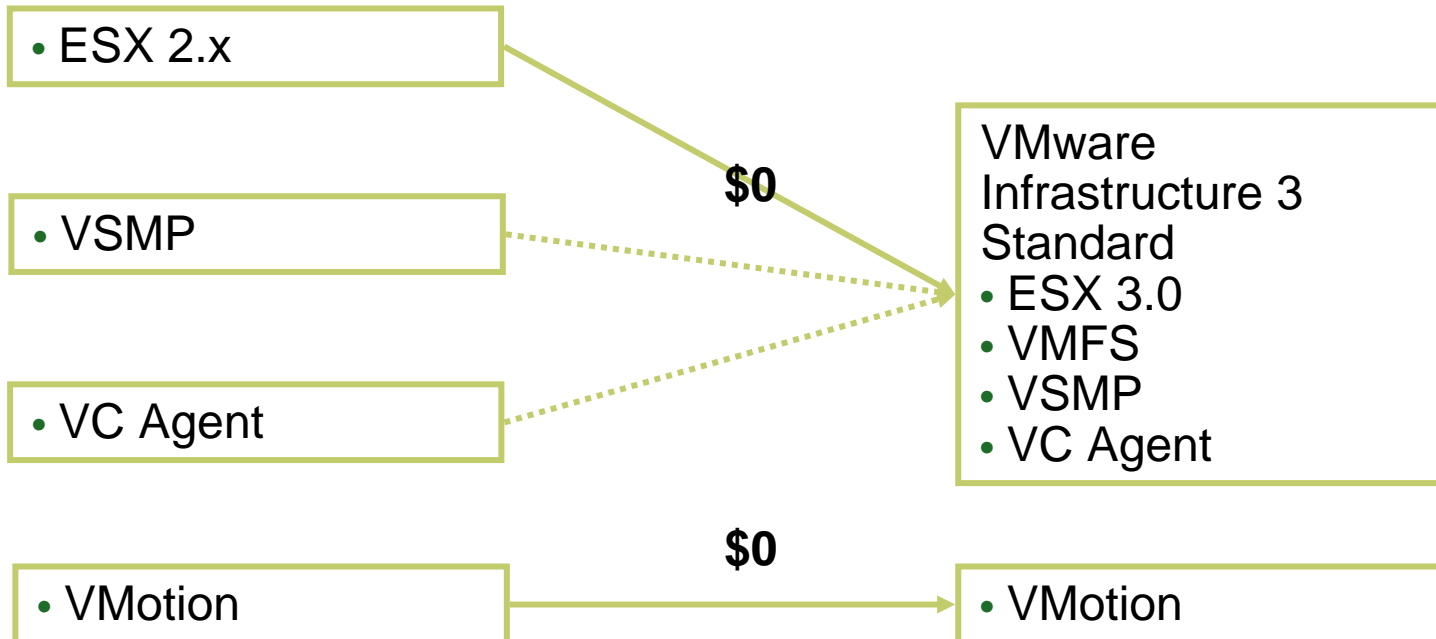
Storage Update ESX 2 Einzellizenzen nach VI3

Storage



2.x Pricing

3.x Pricing





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License Server



Storage



- License Server
 - FlexLM for Managed license
 - like Citrix Presentation Manager – same Server can be used
- Unmanaged License as alternative to Managed License with FelxLM



Storage



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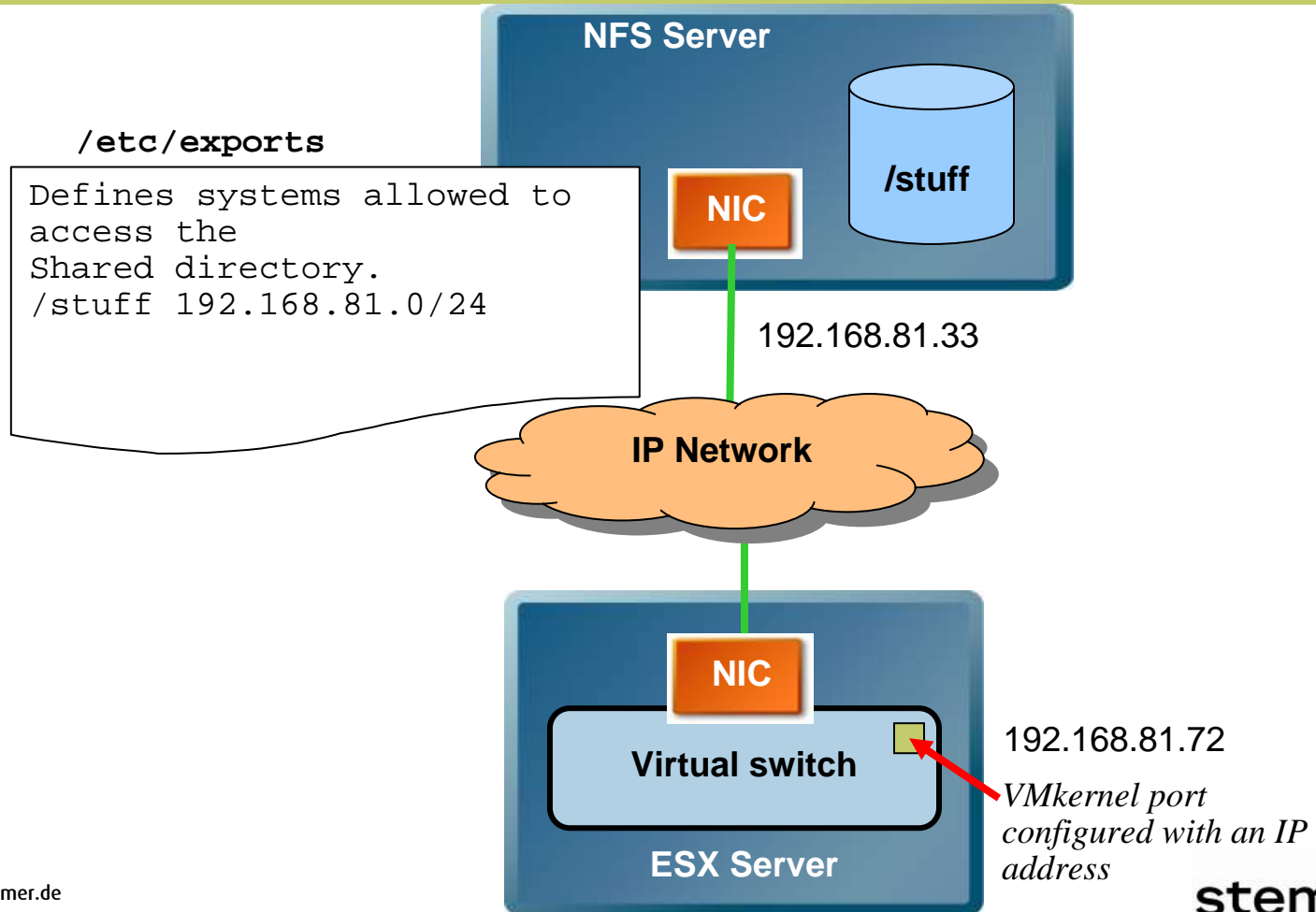
Storageanbindungen



Storage

Anbindung über NFS

Storage





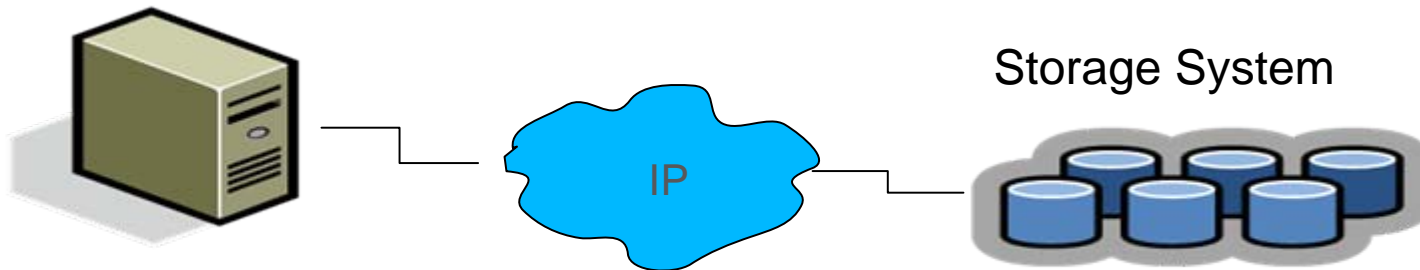
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Anbindung über iSCSI

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- A SCSI transport protocol, enabling access to storage devices over standard TCP/IP networks
 - Maps SCSI block-oriented storage over TCP/IP
 - Similar to mapping SCSI over Fibre Channel





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iSCSI Connectivity

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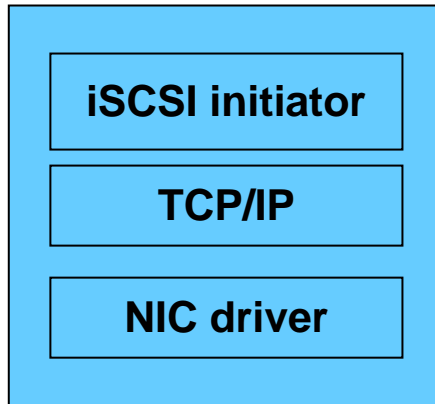


- ESX Server supports both software and hardware initiators

Software initiator

VMkernel

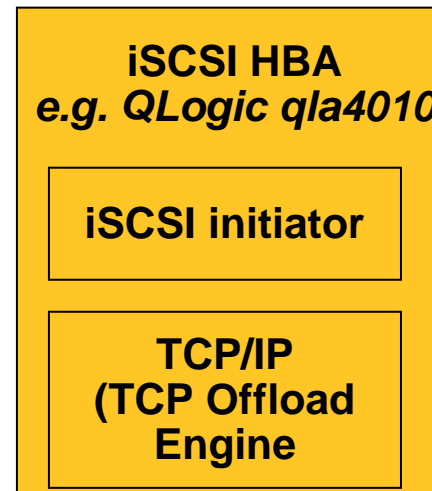
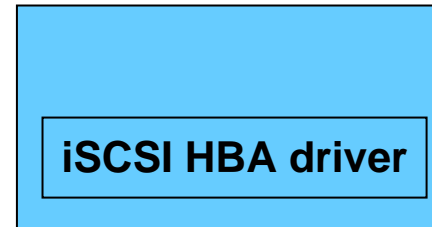
ESX
Server 3.0
host



Hardware initiator

VMkernel

ESX
Server 3.0
host





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Software initiator vs. Hardware initiator



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Software initiator

- Use existing NICs
- Use native vmkernel stack
- Used when performance IS NOT an issue, as server and application performance can degrade significantly!
- Used when cost IS an issue
- Used when no PCI slots are available
- Used for simple connectivity to storage or tape backup

iSCSI storage adapters (hardware initiator)

- Uses less ESX Server resources, especially CPU
- Initially supported adapter-Qlogic qla4010<



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Verwendung von iSCSI

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Boot ESX Server from iSCSI storage

- Using hardware initiator only

Create a VMFS on iSCSI LUN

- To hold VM State, ISO images, and templates

Allows VM access to a raw iSCSI LUN

Allows VMotion migration of a VM whose disk resides on iSCSI LUN



Storage Pfadredundanz bei iSCSI



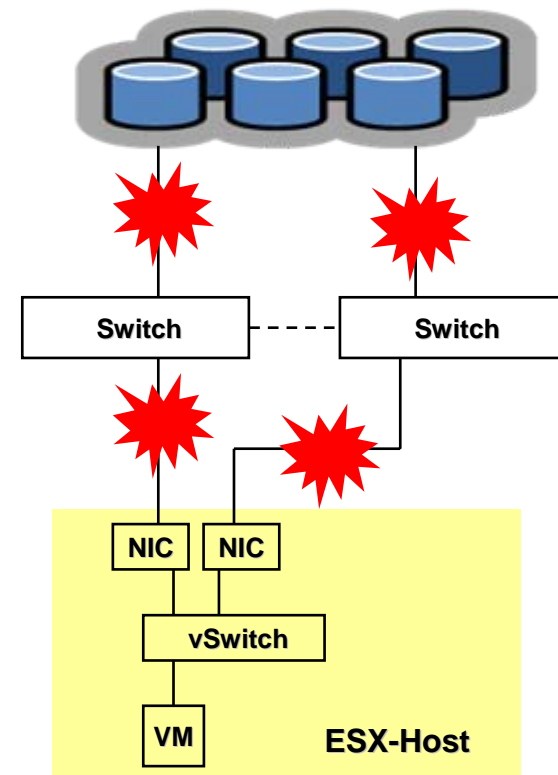
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Redundanz in ESX Konfigurierbar

- Beide NIC's aktiv
 - Aktiver NIC und Passiver NIC
- Redundanz über Ethernetswitch
- z.B. Port Channeling bei Cisco
- Bei Ausfall eines Pfades sind im Betrieb keine Umschaltzeiten spürbar. Vergleich zu FibreChannel: Umschaltzeiten bis zu 60s je nach Stagesystem

Storage System





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Fibre Channel vs. iSCSI vs. NAS



Storage

Vergleich FibreChannel vs. iSCSI vs. NAS (NFS) (1)

Storage



<i>Technology</i>	<i>Protocols</i>	<i>Transfers</i>	<i>Interface</i>	<i>Performance</i>
Fibre Channel	FC/SCSI	Block access of data/LUN	FC HBA	High (due to dedicated network)
iSCSI	IP/SCSI	Block access of data/LUN	iSCSI HBA or NIC	Medium (depends on integrity of LAN)
NAS	IP/NFS	File (no direct LUN access)	NIC and IP switches	Medium (depends on integrity of LAN)

For best performance and security, consider putting iSCSI and NAS on separate and isolated IP network!



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Vergleich FibreChannel vs. iSCSI vs. NAS (NFS) (2)



<i>Technology</i>	<i>Boot VM</i>	<i>Boot ESX Server</i>
Fibre Channel	Yes	Yes
iSCSI	Yes	Yes
NAS	Yes	No



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Vergleich FibreChannel vs. iSCSI vs. NAS (NFS) (3)

Storage



<i>Technology</i>	<i>Clustering</i>	<i>Raw Disk</i>	<i>RDM</i>
Fibre Channel	Yes	Yes	Yes
iSCSI	No	Yes	Yes
NAS	No	No	No



Storage



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Performancevergleich NFS vs. iSCSI vs. FibreChannel

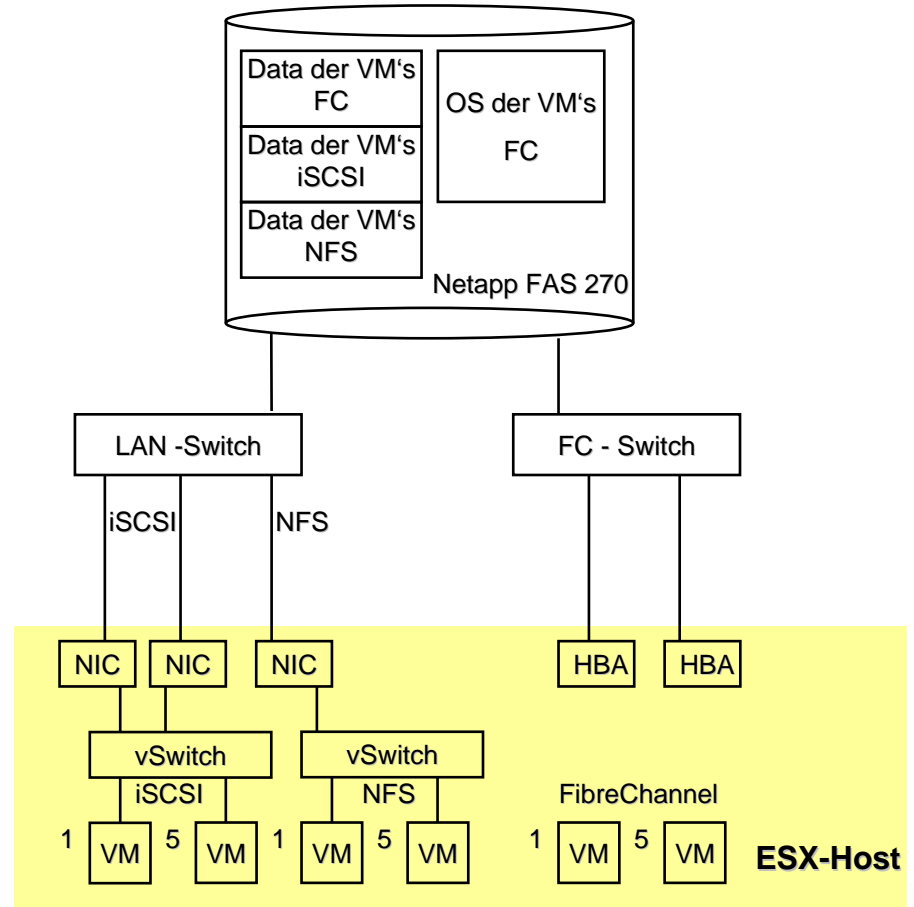


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Testaufbau Disk - Performancetest



- 5 VM's mit W2k3
 - Disk mit OS auf VMFS-LUN über FC
- VMFS – LUN für DATA-Disk über iSCSI
- VMFS – LUN für DATA-Disk über FC
- NFS – Share für DATA-Disk
- Messung mit I/O – Meter
 - Profil 1: 4kB 66% Read, 33% Write
 - Profil 2: 16kB 50% Read, 50% Write
 - Messung 1: Alle 5 VM's mit Profil 1
 - Messung 2: 4 VM's mit Profil 1, 1 VM mit Profil 2





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Testergebnisse NFS

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	1 VM (4k / 16k)		5 VM's		Storage (5 VM's)				
	I/O / s	MB / s	I/O / s	MB / s	CPU Util	I/O / s	Disk Util	Net In kB / s	Net Out kB / s
Messung 1	+++	++	+	+	40%	++	30%		
Messung 2	+++	++	+	+	60%	++	40%		

➤ Mit steigender Anzahl VM's wird die Performance schlechter



Storage

Testergebnisse iSCSI

Storage



	1 VM (4k / 16k)		5 VM's		Storage (5 VM's)				
	I/O / s	MB / s	I/O / s	MB / s	CPU Util	I/O / s	Disk Util	Net In kB / s	Net Out kB / s
Messung 1	++	+	++	+	35%	++	30%		
Messung 2	+++	++	++	+	45%	++	45%		

➤ Die Anzahl VM's hat keinen Einfluss auf die Performance



Storage Testergebnisse RX300 S1 über iSCSI

Storage



	RX 300		Storage (5 VM's)				
	I/O / s	MB / s	CPU Util	I/O / s	Disk Util	Net In kB / s	Net Out kB / s
Profil 1	++++	++	23%	+++	5%	1000	2000
Profil 2	++++	+++	30%	+++	7%	3800	4000

➤ Deutlich bessere Performance als bei einer VM



Storage

Testergebnisse FibreChannel

Storage



	1 VM (4k / 16k)		5 VM's		Storage (5 VM's)				
	I/O / s	MB / s	I/O / s	MB / s	CPU Util	I/O / s	Disk Util	FC In kB / s	FC Out kB / s
Messung 1	+++	+	+++	+	30%	+++	30%		
Messung 2	+++	++	+++	+	43%	+++	40%		

➤ Die Anzahl VM's hat keinen Einfluss auf die Performance



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Vielen Dank für Ihre Aufmerksamkeit

Fragen?