vmware by Broadcom

VMWARE SESSION

69. Infor Anwendertreffen

Computacenter

ABOUT ME

Marc Huppert

Principal Consultant

25 years + Virtualization Experience

VCDX 181 BLOG

XING

https://VCDX181.com

LinkedIn

facebook

@MarcHuppert

249	987	255
Credly Badges	Skills	Shares

Datacenter

HCI

Cloud

AI / ML / DL GenAI

DR

https://www.credly.com/users/marc-huppert

AGENDA

VMWARE SESSION

- VMware by Broadcom
- Lizenzmodelle
- Optimierung von VMs
  - Tuning Methoden
  - BIOS
  - Virtuelle Maschinen
  - Betriebssysteme

VMWARE BY BROADCOM

Computacenter

ALLGEMEINES ZU VMWARE BY BROADCOM

HARD FACTS

Übernahme der VMware durch Broadcom am 22.11.2023

VMware gehört zu 100% der Broadcom

Neuer Name: VMware by Broadcom

Neue Business Units

VCF
inkl. vSAN, vSphere, NSX, Aria

Tanzu

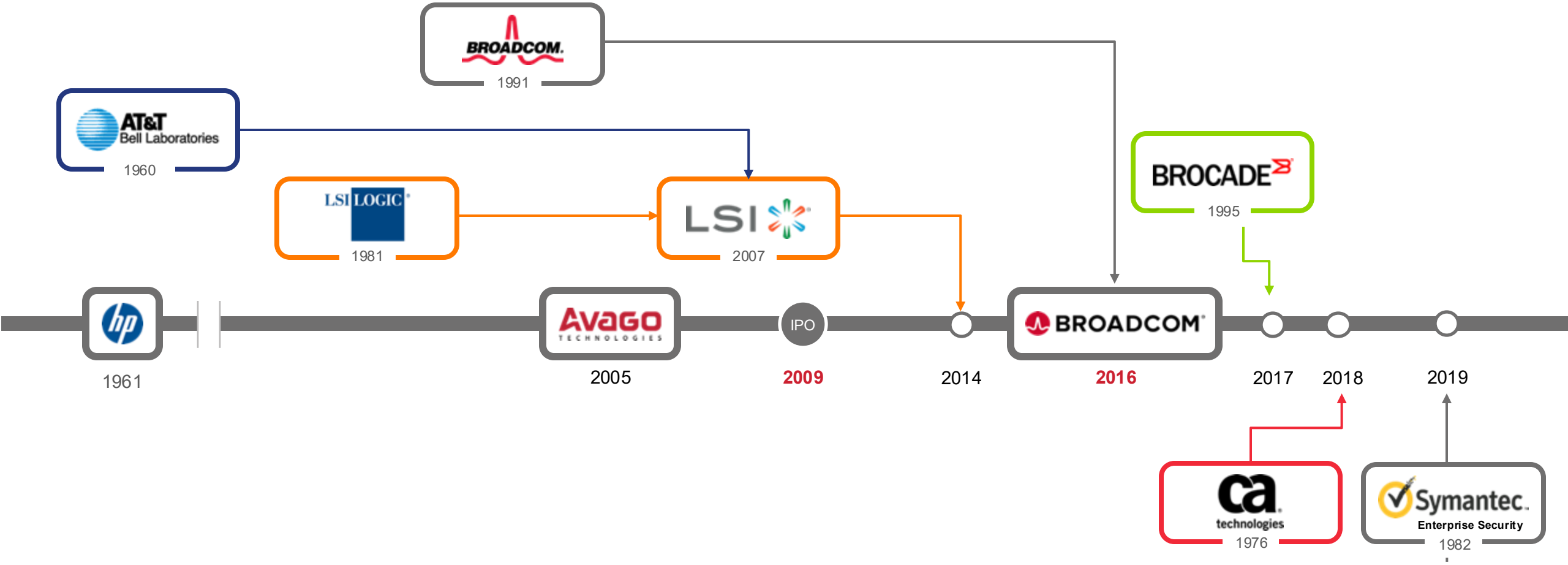
Network & Security

Edge Computing

! Die bisherigen BU für **Carbon Black** und **End User Computing** sind bereits ausgegliedert. EUC ist von KKR gekauft worden.

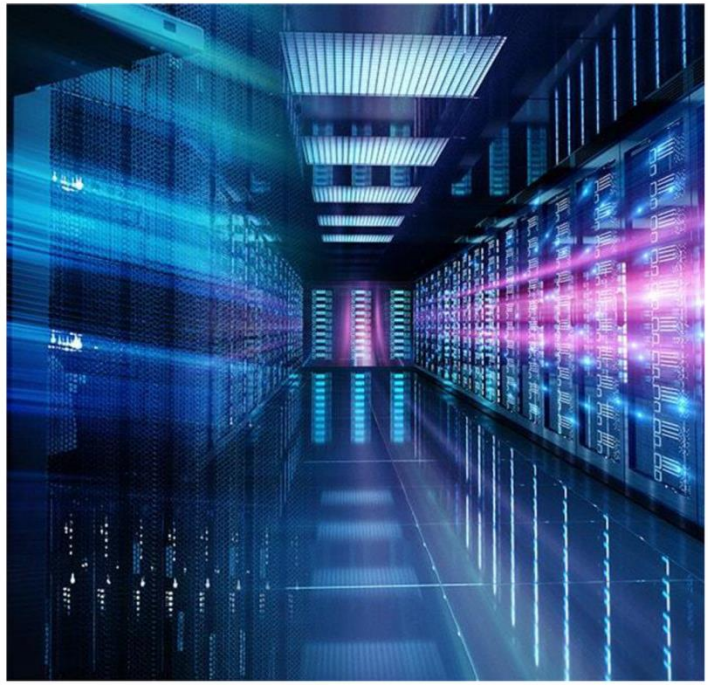
Keine Support Renewals mehr möglich für Perpetual Lizenzen!!!!! Kunden müssen Subscription kaufen

HISTORY BROADCOM



BROADCOM AT A GLANCE

Net revenue of
$33.2B



$4.9B investment in R&D

One of the industry's broadest IP portfolios with **>17,000** patents

22 Category-Leading Semiconductor and Infrastructure Software Divisions

PRODUCTS

VMware Cloud Foundation

Enterprise-Class Hybrid Cloud Solution for Large and Midsize Customers

VMware vSphere Foundation

Secure and Resilient Workload Platform for Midsize and Small Data Centers

Adv. Hybrid Cloud Services

Storage, Ransomware and Disaster Recovery, Advanced Security, Private AI

Value-Added Services for Foundational Offers

Simplify to 2 foundational offers plus add-ons

Attractive pricing to allow customers to benefit faster

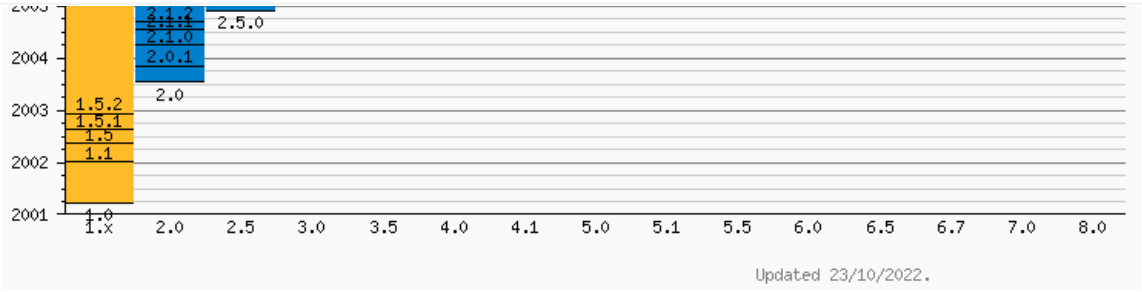
Ease of doing business with improved customer experience

For small deployments, we continue to offer vSphere Standard and vSphere Essentials Plus

VERSIONS

https://support.broadcom.com/group/ecx/productlifecycle

VMware Cloud Foundation	No_Support_Product	VMware vSphere Replication 8.3.0	8.3.0	203564	02-Apr-2020	-
VMware Cloud Foundation	VMware	VMware vSAN - VMware vSphere (vSAN included)	7.0	202589	02-Apr-2020	02-Oct-2025
VMware Cloud Foundation	VMware Cloud Foundation	VMware vSAN - VMware vSphere (vSAN included)	7.0	202589	02-Apr-2020	02-Oct-2025
VMware Cloud Foundation	VMware vSAN	VMware vSphere Hypervisor (ESXi) 7.0U1c	7.0U1c	202805	17-Dec-2020	02-Oct-2025
VMware Cloud Foundation	VMware vSAN	VMware vSphere Hypervisor (ESXi) 7.0U1	7.0U1	202804	06-Oct-2020	02-Oct-2025
VMware Cloud Foundation	VMware vSAN	VMware vSphere Hypervisor (ESXi) 7.0b	7.0b	202803	23-Jun-2020	02-Oct-2025
VMware Cloud Foundation	VMware vSAN	VMware vSphere Hypervisor (ESXi) 7.0.0	7.0.0	202802	02-Apr-2020	02-Oct-2025
VMware Cloud Foundation	VMware vSAN	VMware vSAN - VMware vSphere (vSAN included)	7.0	202589	02-Apr-2020	02-Oct-2025



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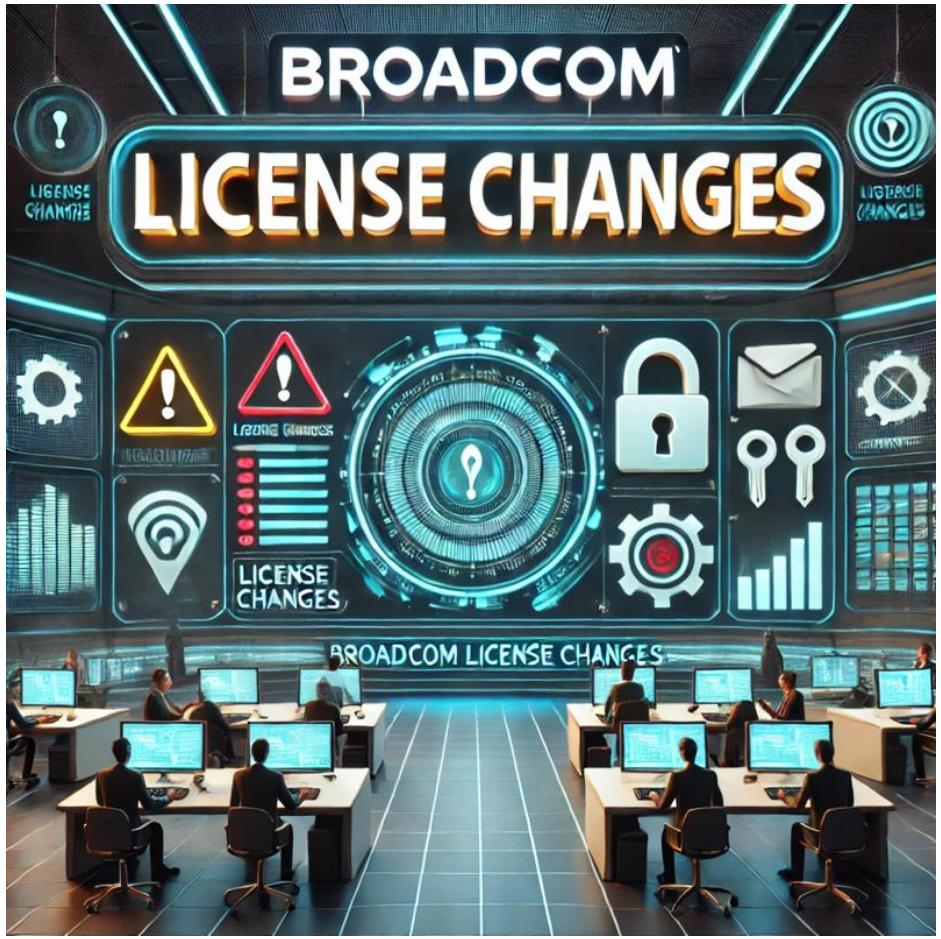


LIZENZMODELLE

Computacenter

Das Getränke „AIDA Comfort Deluxe" (ab 25 Jahren) enthaltet folgende Leistungen:

- Cocktails und Mixgetränke (mit und ohne Alkohol)
- Milchshakes und Frozzies
- Kaffee- und Teespezialitäten (mit und ohne Alkohol)
- leckere Fruchtsäfte
- gezapfte Softgetränke (Wasser, Fanta, Sprite und Coca-Cola)
- Softgetränke aus Flaschen und Dosen (Fanta, Sprite, Coca-Cola, Red Bull und Thomas Henry Limonaden)
- Weine und Sekt im Glas
- frisch gezapfte Biere und ausgewählte Flaschenbiere (mit und ohne Alkohol)
- Spritzgetränke (z. B. Aperol Spritz, Hugo)

VCF

All Inclusive bezieht sich nur auf Speisen und Getränke an Bord.

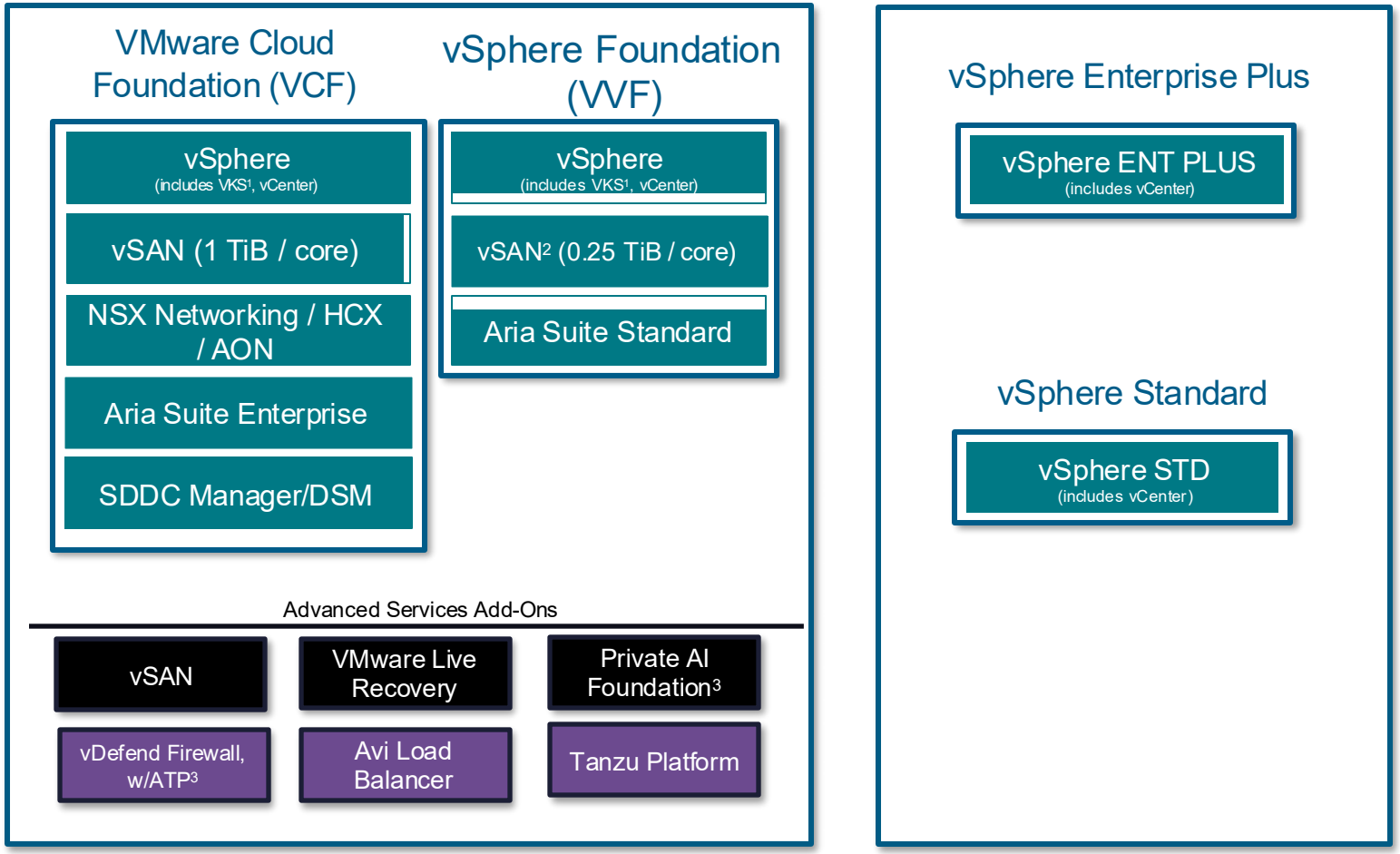
Landausflüge, Shows und Exclusive Restaurants sind extra zu bezahlen.....

Gäste von 2 bis 24 Jahren erhalten das sogenannte Getränkepaket "Kids & Teens Comfort". Das Paket enthält folgende Leistungen:

- alkoholfreie Cocktails und Mixgetränke
- Kakao und Früchtetee und Kräutertee
- leckere Fruchtsäfte
- gezapfte Softgetränke (Wasser, Fanta, Sprite und Coca-Cola)
- Softgetränke aus Flaschen (Fanta, Sprite und Coca-Cola)
- Milchshakes & Frozzies

VVF

VCF DIVISION PRIMARY OFFERS



Support: Broadcom Maintenance

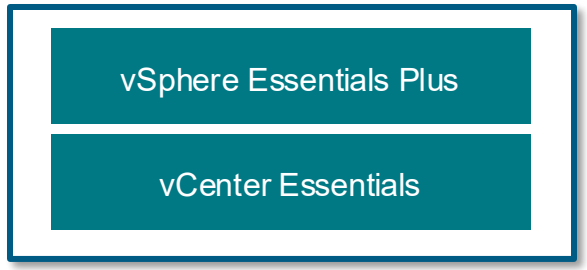
1. VKS: formerly known as TKGs
2. vSAN capacity increase to 0.25 TiB is available in VVF purchases starting 11/22/24.
3. Add-on for VCF only

End of Sale

VSPHERE ESSENTIALS PLUS

END OF SALE NOVEMBER 11, 2024

vSphere Essentials Plus



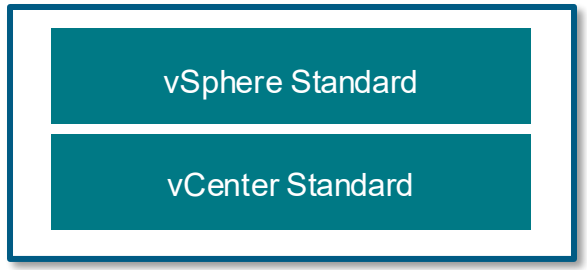
Pricing and Licensing

- End of Sale on November 11, 2024
- Existing customers can continue using product until end of subscription term
- Cannot renew or expand after Nov. 11, 2024

- Per core pricing
- Sold in 96-core license packs
- 16 cores per CPU minimum; 3 hosts maximum
- 3-year term recommended (annual billing available)
- Includes Broadcom Maintenance

VSPHERE STANDARD (VVS)

vSphere Standard



Licensing

- End of Sale on April 10, 2025 @APAC

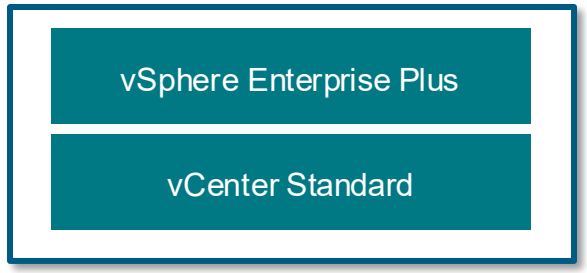
- Subscription
- Per core pricing
- 16 cores per CPU minimum
- Price per core per year with 3-year term recommended (annual billing available)
- Includes Broadcom Maintenance Support

New Product

VSPHERE ENTERPRISE PLUS

GA NOVEMBER 11, 2024

vSphere Enterprise Plus



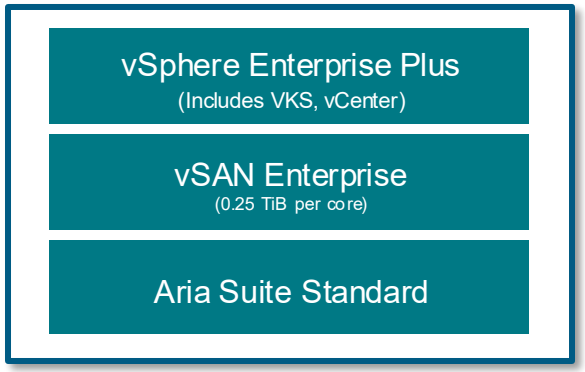
Pricing and Licensing

- Subscription
- Per core pricing
- 16 cores per CPU minimum
- 3-year term recommended (annual billing available)
- Includes Broadcom Maintenance

VSPHERE FOUNDATION (VVF)

PRICING AND PACKAGING

vSphere Foundation



Licensing

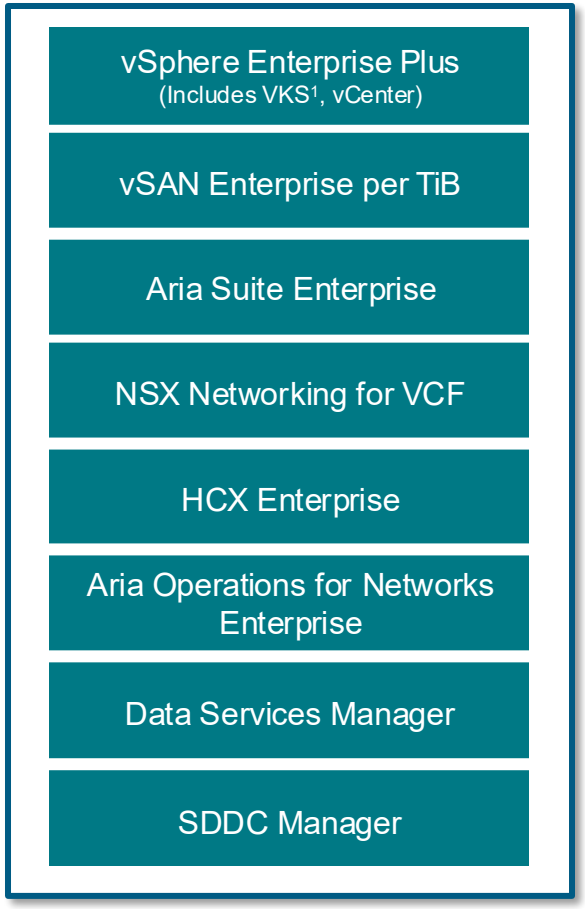
- Subscription
- Per core pricing
- 16 cores per CPU minimum
- Price per core per year with 3-year term recommended (annual billing available)
- Includes Broadcom Maintenance Support
- vSAN 0.25 TiB capacity per core available 11/22/24

- (previously, vSAN 100 GiB trial capacity included in 8.0U2b release)

1 VKS: formerly known as TKGs
2 vSAN capacity increase to 0.25 TiB is available in VVF purchases starting 11/22/24.

VMWARE CLOUD FOUNDATION (VCF)

VMware Cloud Foundation



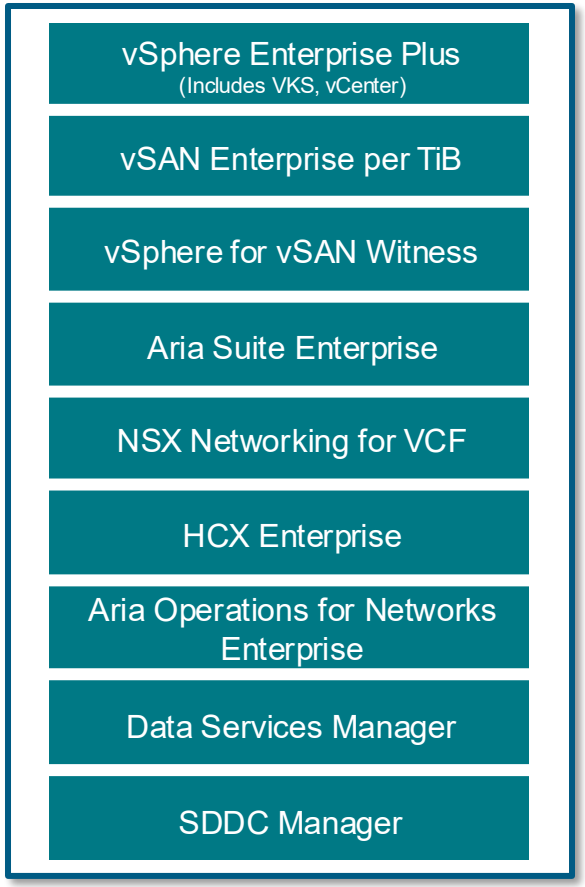
Licensing

- Subscription
- Per core pricing
- 16 cores per CPU minimum
- Price per core per year with 3-year term recommended (annual billing available)
- vSAN: 1 TiB per core
- Broadcom Maintenance Support
- It is strongly recommended to attach the Support Account Manager Add-On

[1] VKS: formerly known as TKGs

VMWARE CLOUD FOUNDATION EDGE (VCFE)

VMware Cloud Foundation Edge



Pricing and Licensing

- Subscription
- 8 cores per CPU minimum
- 3-year term recommended (annual billing available)
- vSAN: 1 TiB per core[1]
- Broadcom Maintenance
- Includes complimentary vSphere for vSAN Witness to support deploying the vSAN Witness VM locally[2]
- Restrictions:
  - Edge locations only
  - Minimum of 10 sites within 1 year of VCFE deployment
  - Maximum of 256 Cores per Edge site
- VECO will be added to VCF Edge in the future (timing TBD)
- SKU: VCF-CLD-FND-EDGE-5 VMware Cloud Foundation Edge 5 - For Edge Deployments Only

1. vSAN can only be aggregated and utilized across Cores where the vSphere for VCF Edge is deployed. VCF Edge licenses can be purchased for additional capacity.
2. If the vSAN Witness VM is deployed back at the data center, the host will require licensing. The vSphere for vSAN Witness license cannot be deployed at the data center.

ADD-ONS

Add-on	For	Description
vSAN	VVF, VCF	vSAN Capacity Add-on (1 TiB)
vDefend Firewall	VCF	NSX GW- & Distributed FW, with and without Adv. Threat Prevention
Private AI Foundation	VCF	AI, needs NVIDIA AI Ent. Lic.
VMware Live Recovery	ALL	Site Recovery + Cyber Recovery
AVI Load Balancer	ALL	Load Balancer incl. WAF

VMWARE TUNING

Computacenter

PERFORMANCE TUNING METHODOLOGY

METHODOLOGY

Follow these best practices for performance-tuning your vSphere infrastructure:

- Assess performance:
- Use appropriate monitoring tools.
- Record a numerical benchmark before changes.
- Identify the limiting resource.
- Make more resources available:
- Allocate more.
- Reduce competition.
- Log your changes.
- Benchmark again.

Do not make casual changes to production systems.

TOOLS

Many resource and performance monitoring tools are available to administrators to use with vSphere.

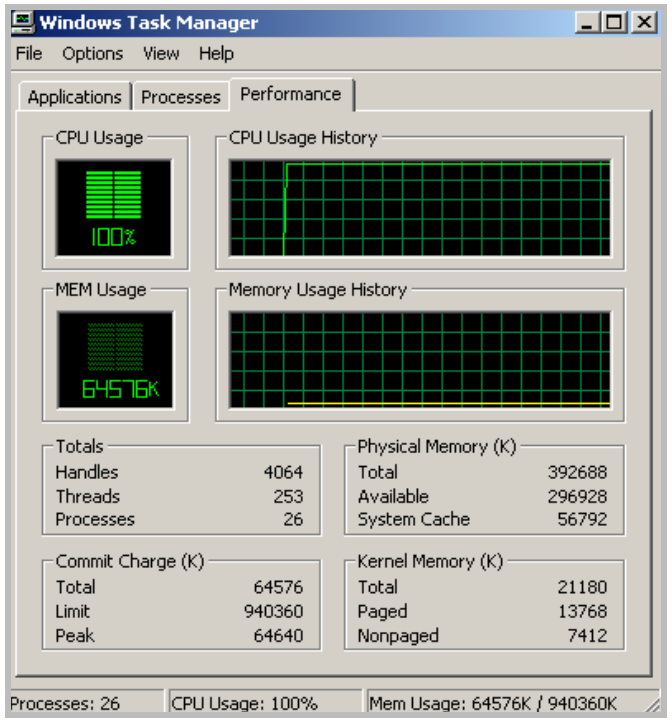
Inside the Guest OS
Perfmon DLL Task Manager

Outside the Guest OS
vCenter Server performance charts vRealize Operations Hyperic vSphere/ESXi system logs `resxtop` and `esxtop`

TOOLS

To monitor performance in the guest operating system, use tools that you are familiar with, such as Windows Task Manager.

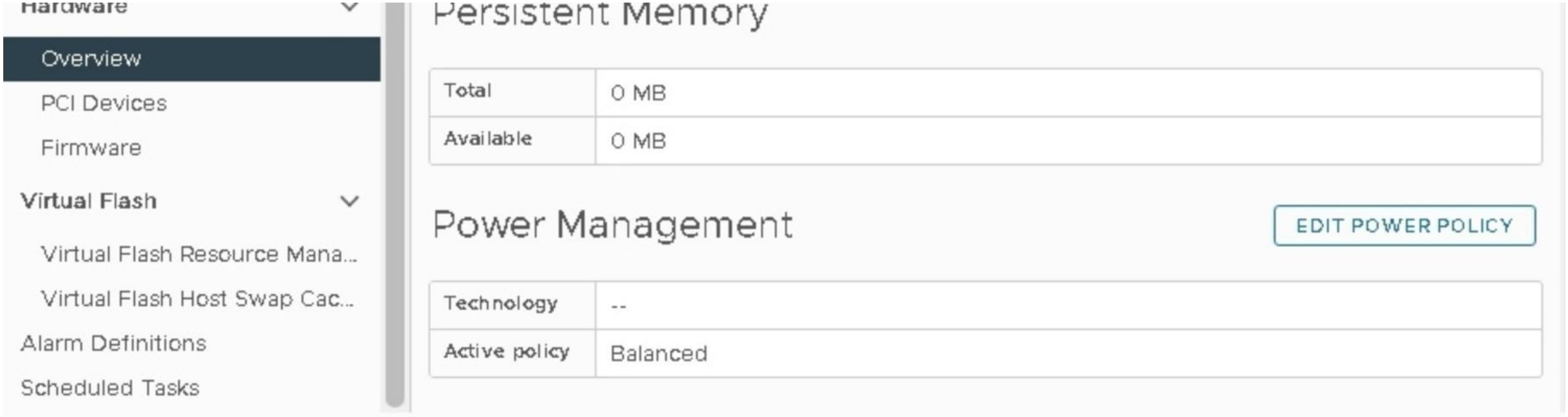
Windows Task Manager



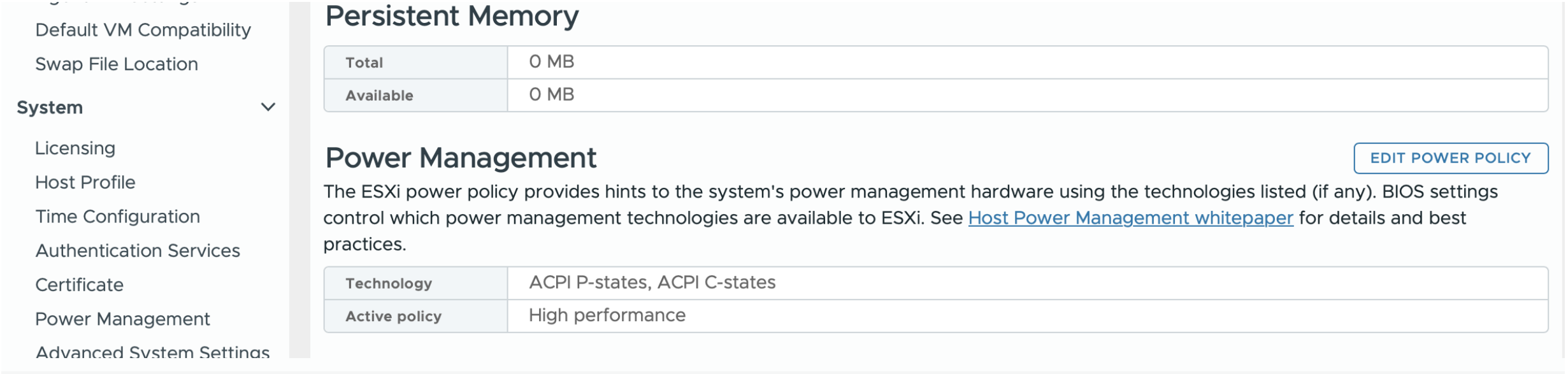
KNOW YOUR WORKLOAD

Always check your Power Management Settings

ESX POWER MANAGEMENT



ESX POWER MANAGEMENT



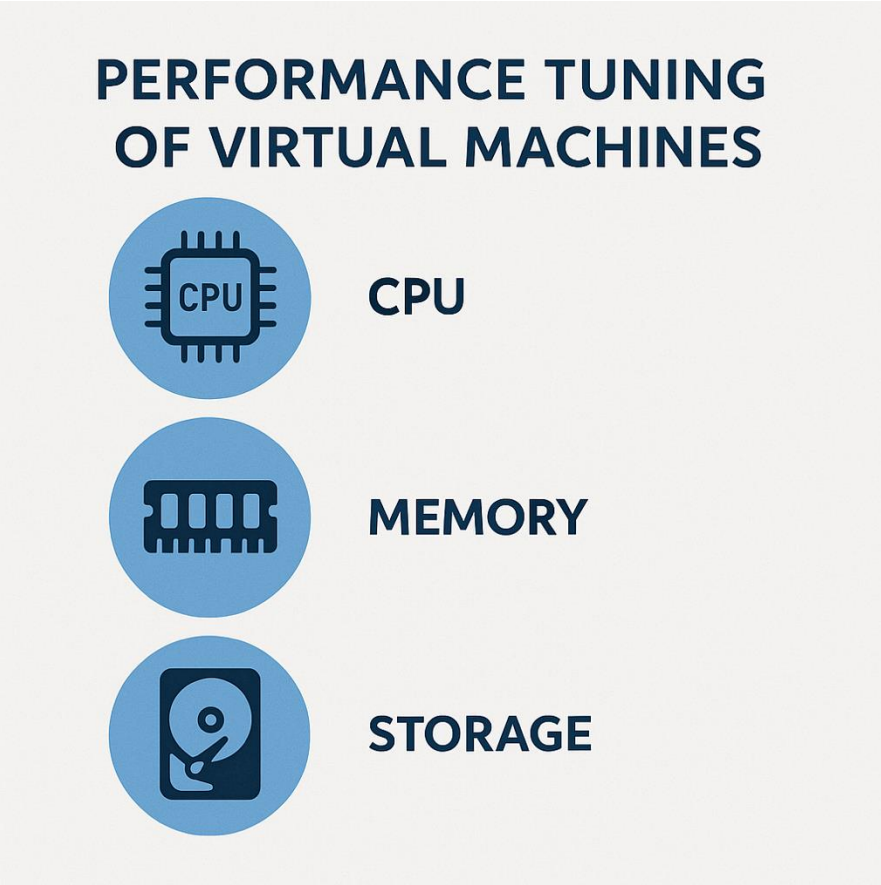
PWR_MGMT_PROFILES DELL

	System Profile Settings	System Profile (Power Management Profile)				
	System Profile	**Perf. Per Watt (DAPC)**	**(...)**	**Performance**	**Cust.**	**Custom Recommended**
P-State	CPU Power Management	System DBPM (DAPC)	(...)	Maximum Performance	any	OS DBPM or Maximum Performance
	Memory Frequency	Maximum Performance	(...)	Maximum Performance	any	Maximum Performance
	Turbo Boost	Enabled	(...)	Enabled	any	Enabled
	Energy Efficient Turbo	Enabled	(...)	Disabled	any	Disabled
C1E	C1E	Enabled	(...)	Disabled	any	Enabled
Deep C	C States	Enabled	(...)	Disabled	any	Enabled
	Collab. CPU Performance Control	Disabled	(...)	Disabled	any	Disabled
	Memory Patrol Scrub	Standard	(...)	Standard	any	Standard
	Memory Refresh Rate	1x	(...)	1x	any	1x
	Uncore Frequency	Dynamic	(...)	Maximum	any	Maximum
	Energy Efficient Policy	Balanced Performance	(...)	Performance	any	Performance
	# of TB Enabled Cores for CPU 1	All	(...)	All	any	All
	# of TB Enabled Cores for CPU 2	All	(...)	All	any	All
	Monitor/Mwait	Enabled	(...)	Enabled	any	Enabled

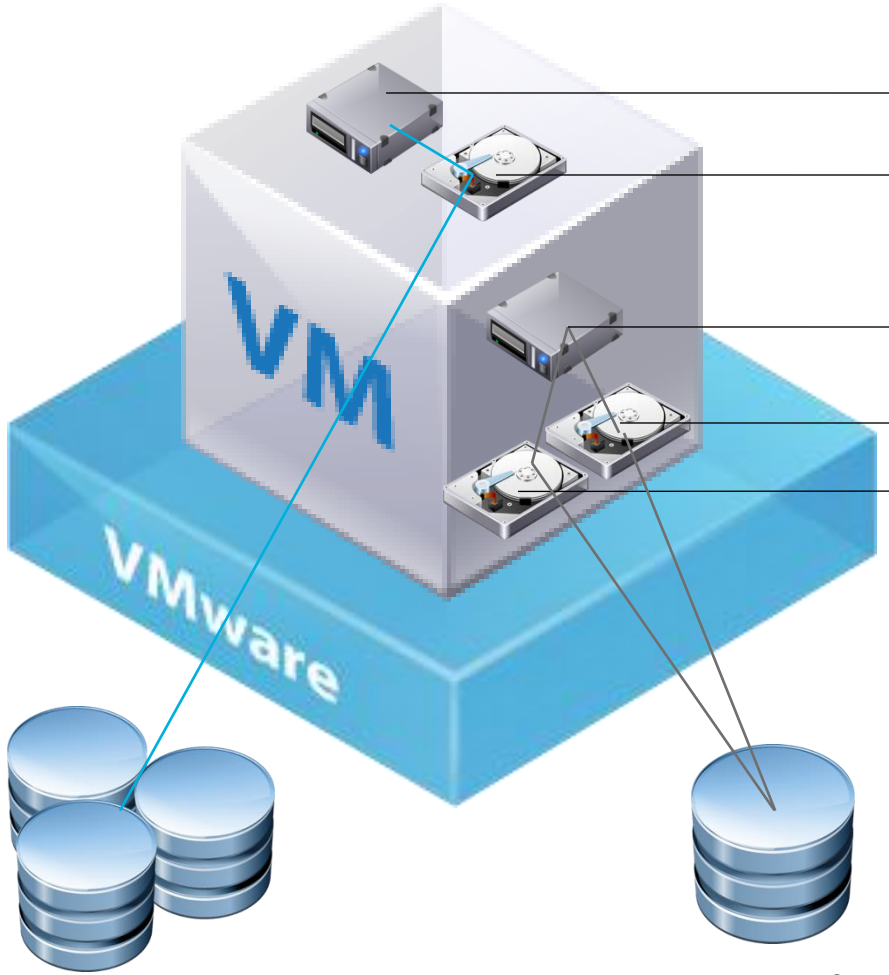
PWR_MGMT_PROFILES HPE

	Power Management	Power Profile (Power Management Profile)					
	Power Profile	**Balanced Power and Perf.**	(...)	**Maximum Performance**	**Cust.**	**Custom Recommended**	
P-State	Power Regulator	Dynamic Power Savings Mode	(...)	Static High Performance Mode	any	OS Control Mode	or SHPM
Deep C	Min. Proc. Idle Power Core C-State	C6 State	(...)	No C-states	any	C6 State	
	Min. Proc. Idle Power Package Core C-State	Package C6 (retention) State	(...)	No Package State	any	PC6 (retention) State	
	Advanced Power Options						
	Intel QPI Link Power Management	Enabled	(...)	Disabled	any	Disabled	
	Intel QPI Link Frequency	Auto	(...)	Auto	any	Auto	
	Intel QPI Link Enablement	Auto	(...)	Auto	any	Auto	
	Energy/Performance Bias	Balanced Performance	(...)	Maximum Performance	any	Maximum Performance	
	Maximum Memory Bus Frequency	Auto	(...)	Auto	any	Auto	
	Channel Interleaving	Enabled	(...)	Enabled	any	Enabled	
	Maximum PCI Express Speed	Maximum Supported	(...)	Maximum Supported	any	Maximum Supported	
	Dynamic Power Savings Mode Response	Fast	(...)	Fast	any	Fast	
	Collaborative Power Control	Enabled	(...)	Enabled	any	Disabled	
	Redundant Power Supply Mode	Balanced Mode	(...)	Balanced Mode	any	Balanced Mode	
	Intel DMI Link Frequency	Auto	(...)	Auto	any	Auto	

VIRTUAL MACHINES



OPTIMAL VM



VMware **PVSCSI** Controller or NVMe

SCSI / NVMe 1:0 **Data**

PVSCSI Controller or NVMe

SCSI / NVMe 0:0 **OS**

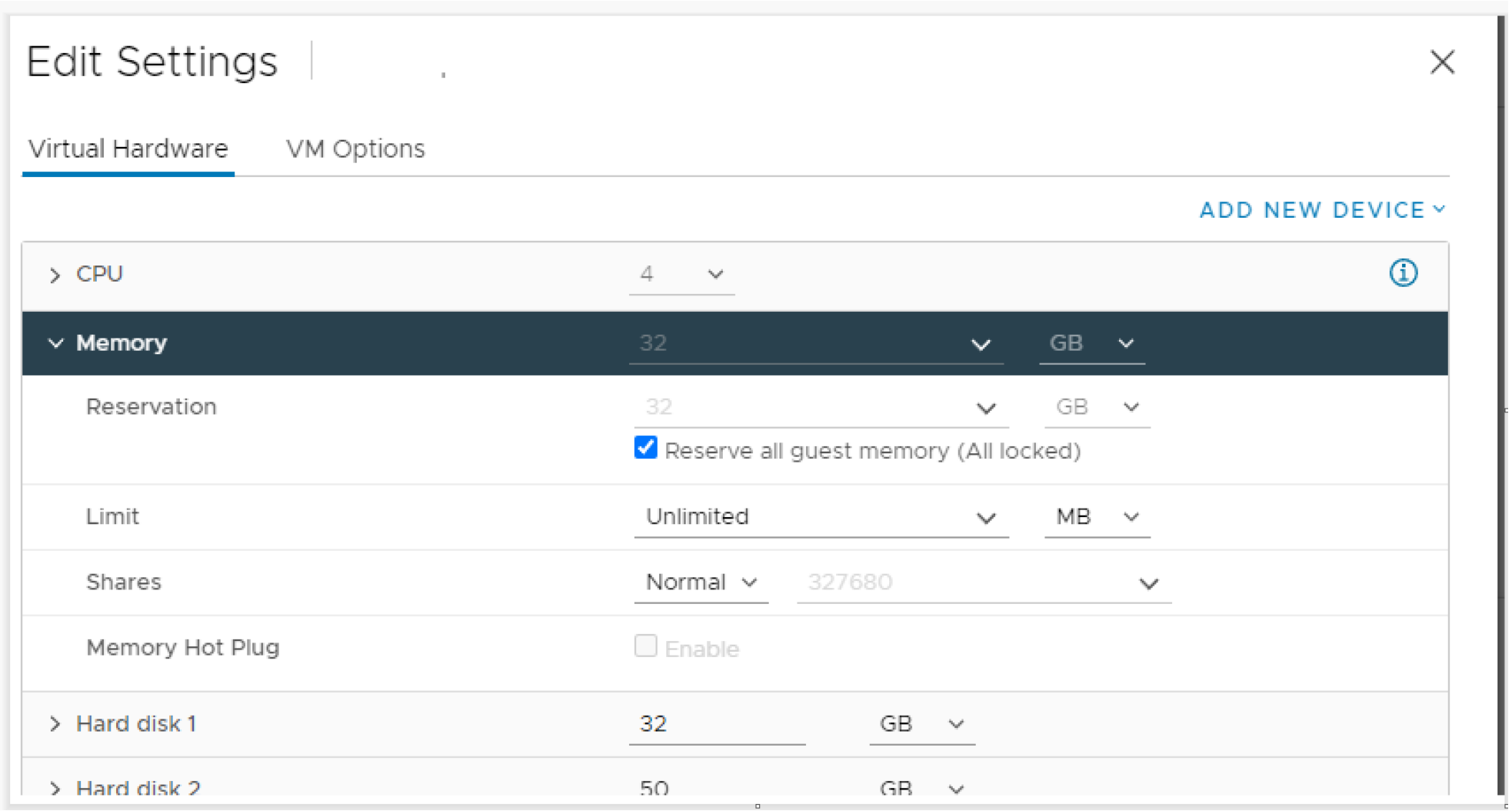
SCSI / NVMe 0:1 **PageFile**

vmxnet3

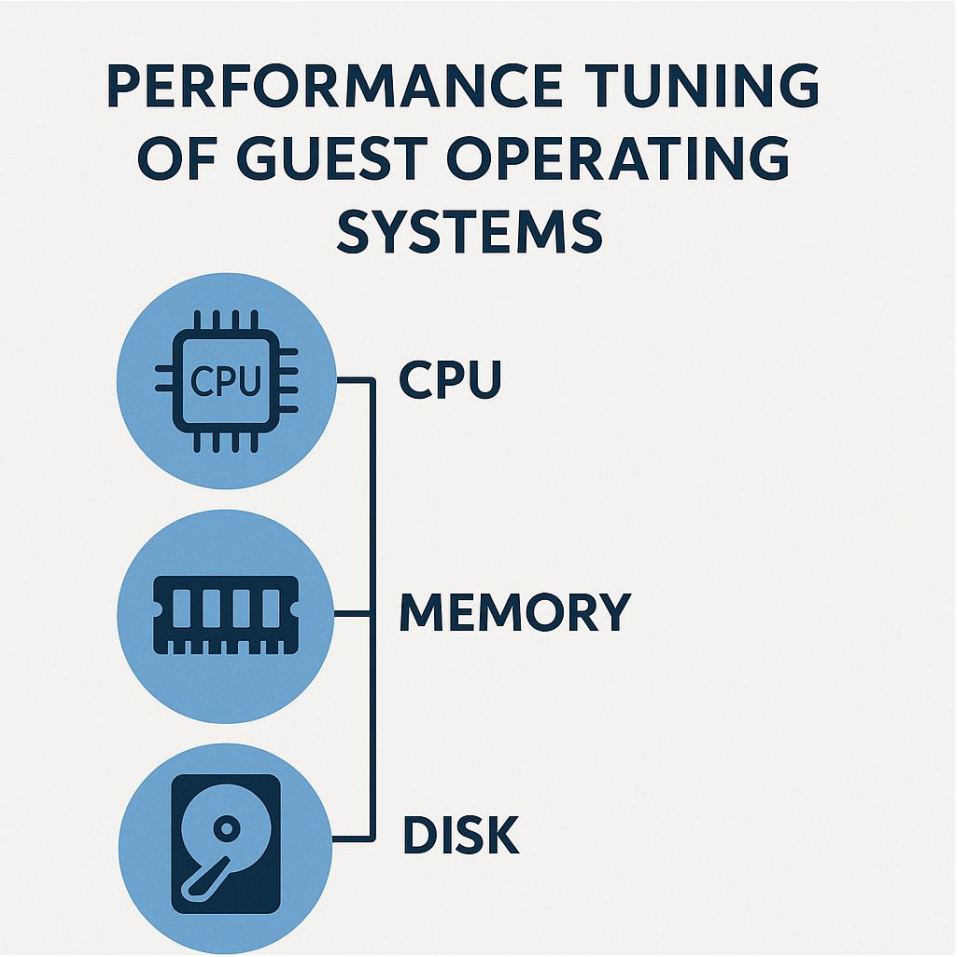
High Performance Policy / Storage

Normal Policy or Storage

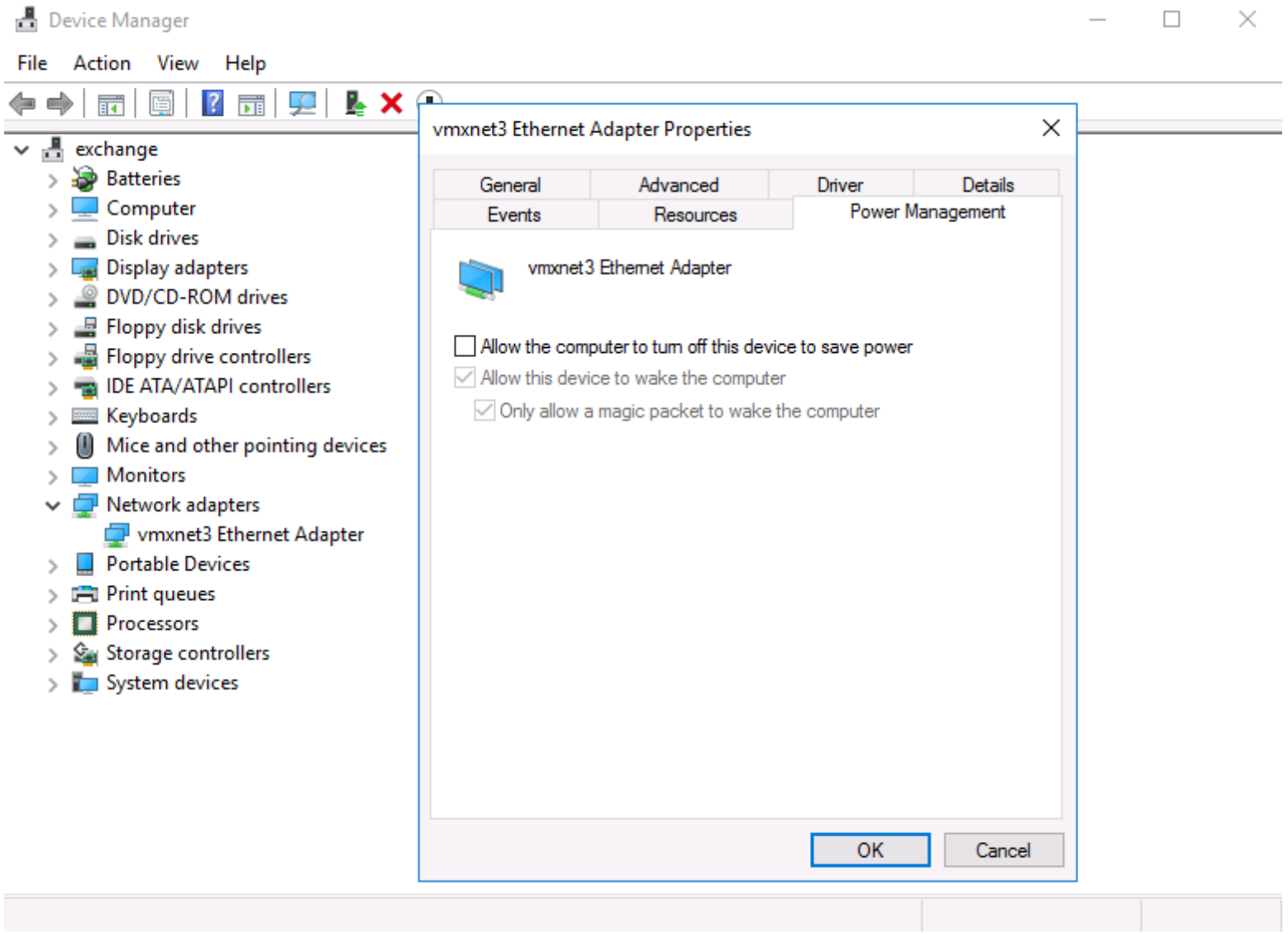
OPTIMAL VM



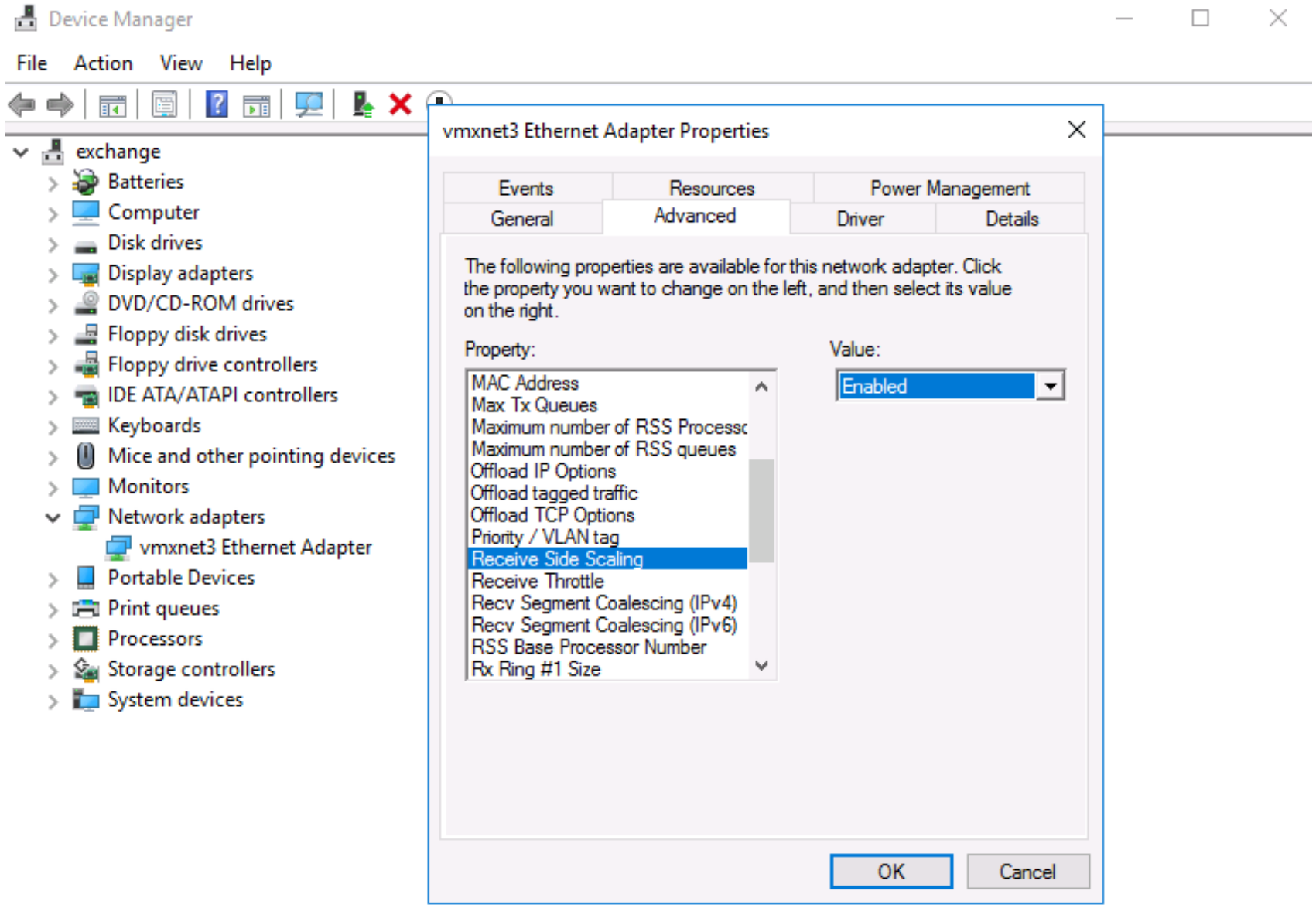
GUEST OS



ENERGY CONTROL



RSS



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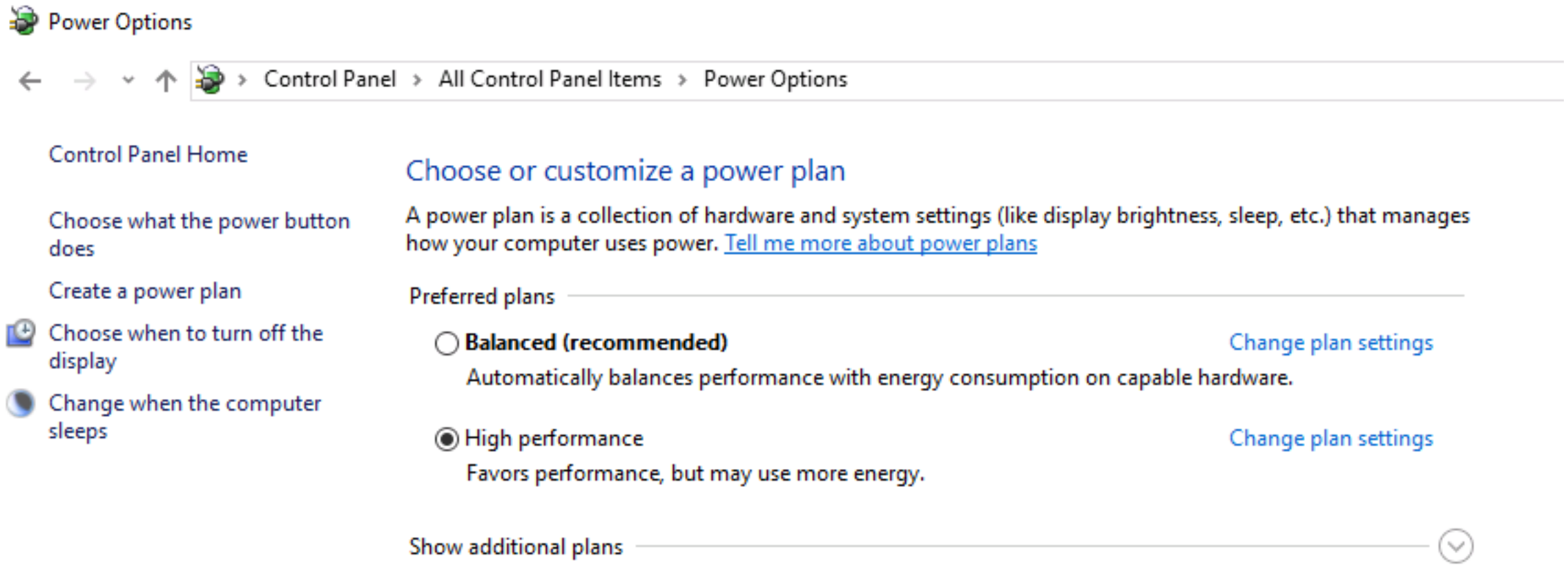
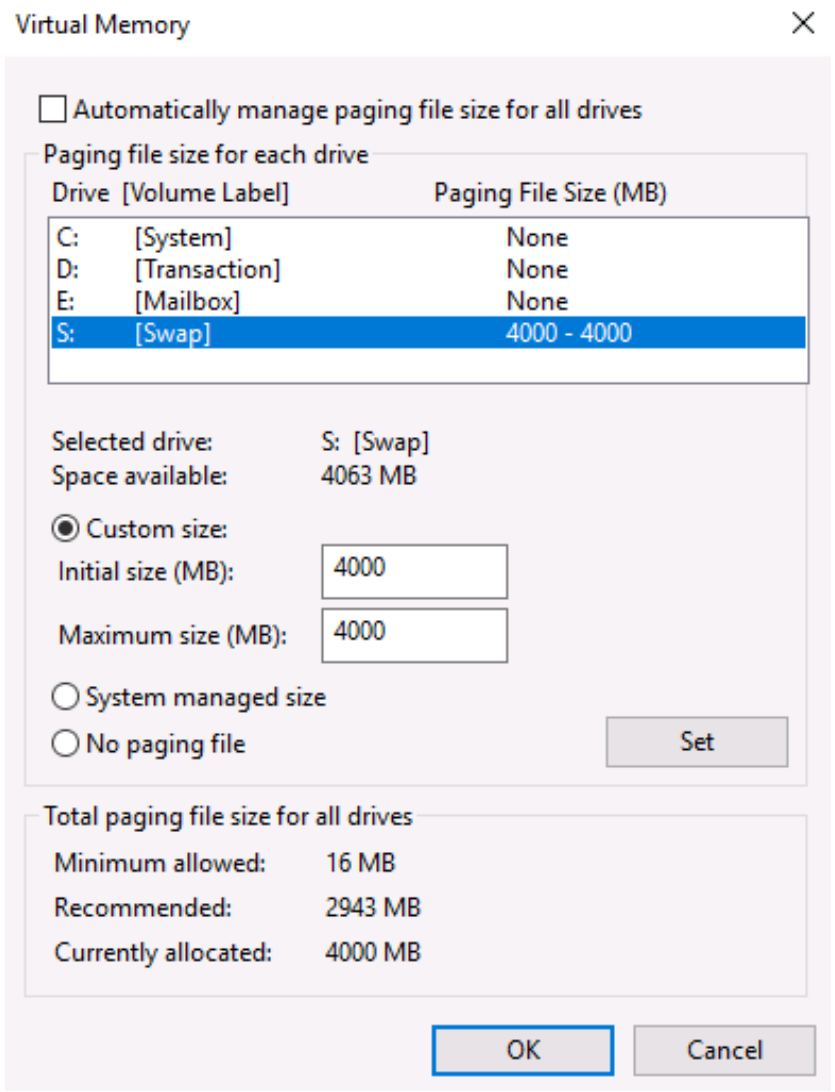
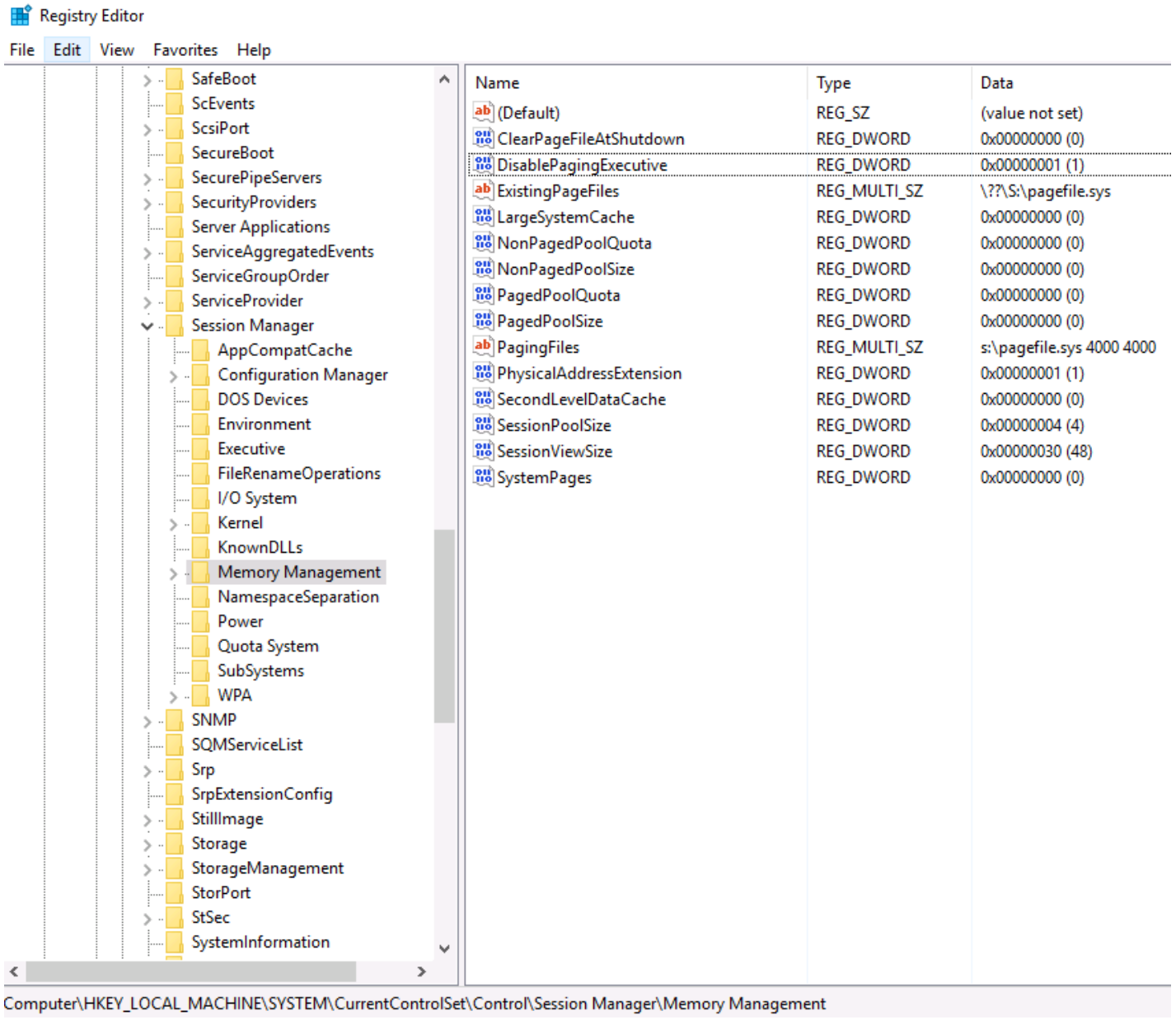
POWER OPTIONS



PAGE FILE



DISABLE PAGING EXECUTIVE



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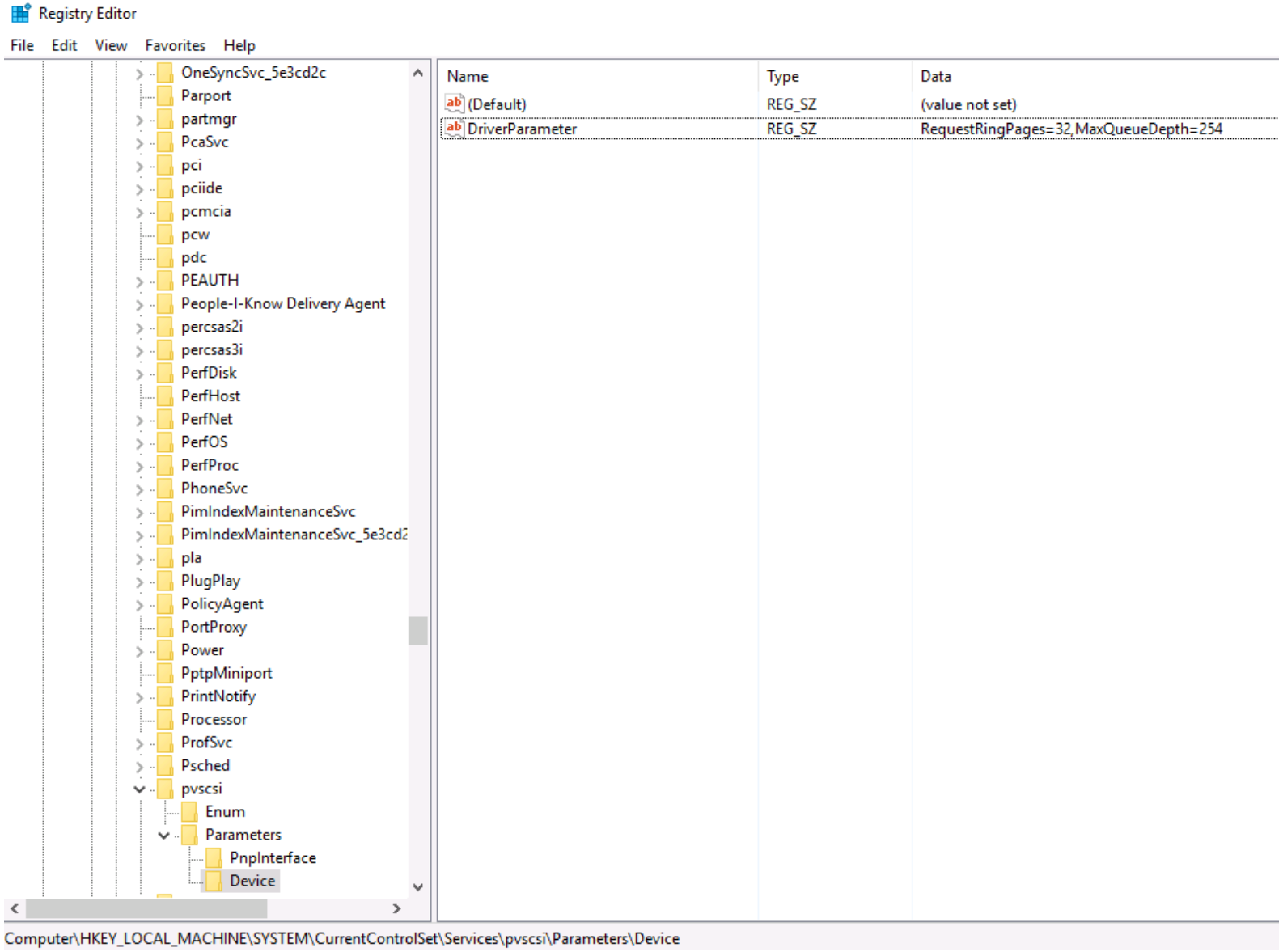
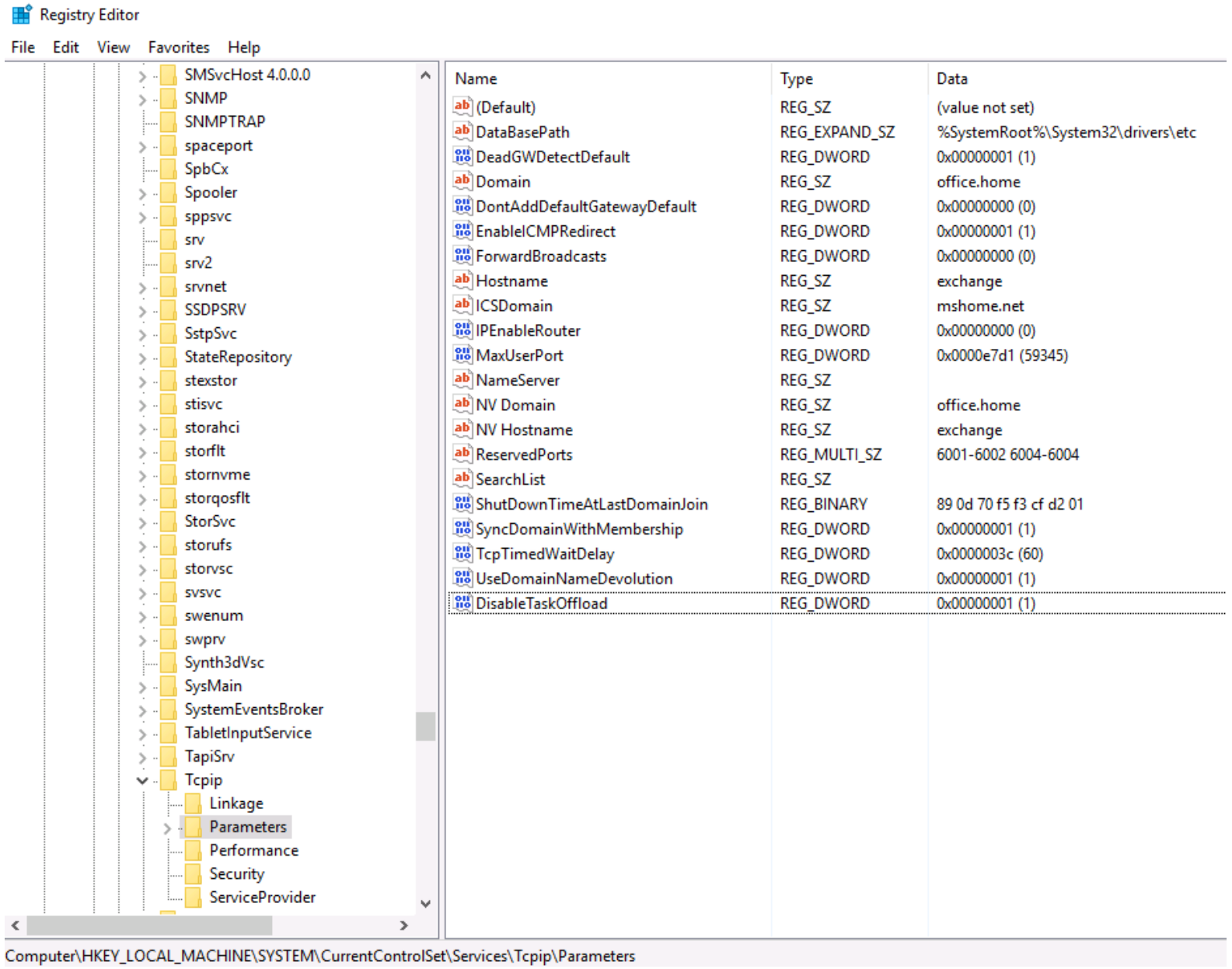
OPTIMIZE PVSCSI



DISABLE NIC OFFLOADING



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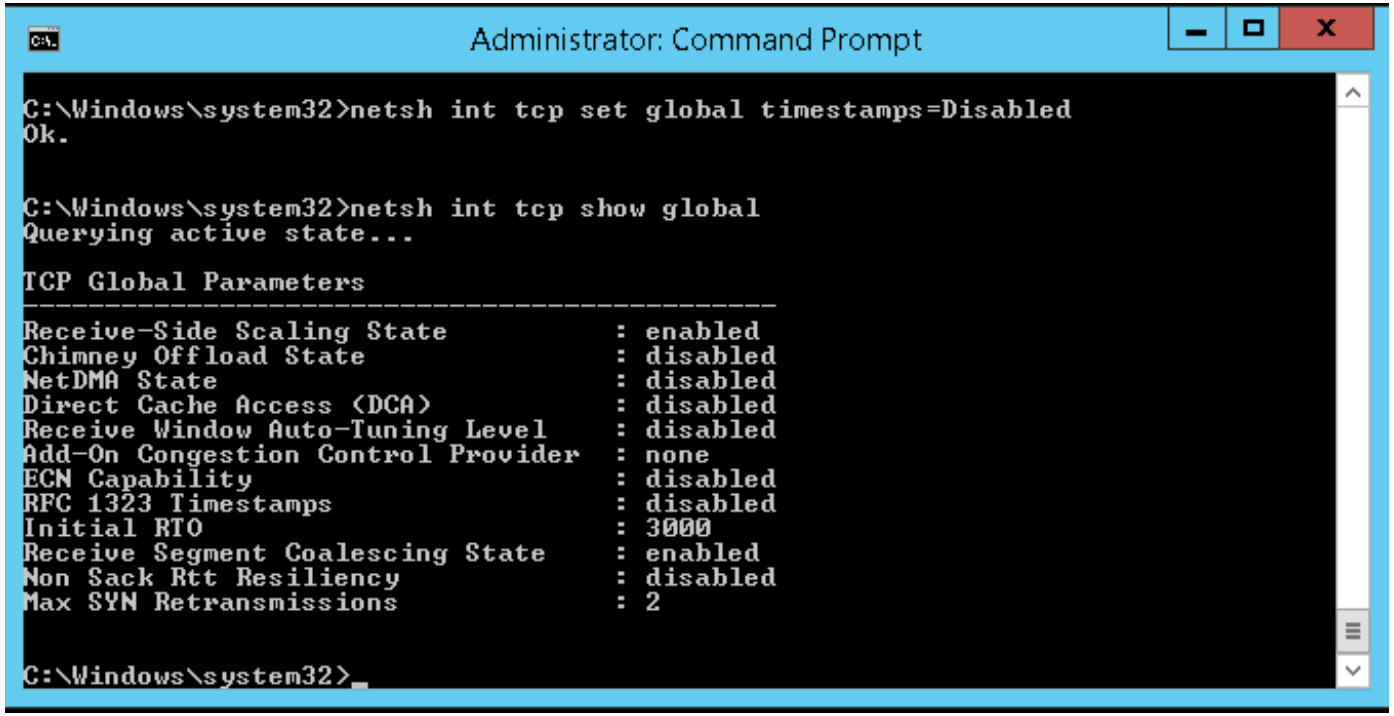
VMXNET3 TUNING

netsh int tcp set global chimney=Disabled
netsh int tcp set global autotuninglevel=Disabled
netsh int tcp set supplemental custom congestionprovider=none
netsh int tcp set global ecncapability=Disabled
netsh int ip set global taskoffload=disabled
netsh int tcp set global timestamps=Disabled



GEEK STUFF…..

DEEP DIVE INTO VMS

```
 1:29:47am up 14 min, 515 worlds, 2 VMs, 4 vCPUs; CPU load average: 0.16, 0.00, 0.00
PCPU USED(%): 4.6  53 1.0  54  33 0.1 0.0 0.0 0.0 0.0 1.0 4.9  16  25  45  16  19  38 0.0 0.3 AVG:  15
PCPU UTIL(%): 4.7  59 0.7  60  32 0.2 0.3 0.3 0.2 0.3 1.0 4.5  16  27  47  17  19  39 0.6 0.5 AVG:  16
Group to expand/rollup (gid): 7799

    ID      GID NAME             NWLD   %USED    %RUN    %SYS   %WAIT %VMWAIT    %RDY   %IDLE %OVRLP  %CSTP  %MLMTD  %SWPWT
  7799     7799 vm0-netperf-x64     9  160.23  131.88   29.93  768.09    2.24    0.05   65.98   0.68   0.00    0.00    0.00
  7815     7815 vm1-netperf-x64     9  138.67  113.72   31.47  786.25    3.73    0.03   82.65   0.87   0.00    0.00    0.00
```

```
 1:30:54am up 15 min, 516 worlds, 2 VMs, 4 vCPUs; CPU load average: 0.15, 0.00, 0.00
PCPU USED(%):  32  22  15  21  26 0.3  27 0.0 0.9 0.8  40  32 2.1 0.8 0.2  60  29 0.0 0.2 0.4 AVG:  15
PCPU UTIL(%):  35  22  18  21  30 0.5  30 0.0 0.3 0.8  42  33 2.2 0.8 0.5  62  32 0.3 0.2 0.0 AVG:  16

    ID      GID NAME             NWLD   %USED    %RUN    %SYS   %WAIT %VMWAIT    %RDY   %IDLE %OVRLP  %CSTP  %MLMTD  %SWPWT
 36947     7799 vmx                1   26.76    0.04   26.72   99.93       -    0.01    0.00   0.00   0.00    0.00    0.00
 36949     7799 vmast.36948        1    0.07    0.07    0.00   99.91       -    0.00    0.00   0.00   0.00    0.00    0.00
 36951     7799 vmx-vthread-5:v    1    0.00    0.00    0.00   99.98       -    0.00    0.00   0.00   0.00    0.00    0.00
 36952     7799 vmx-vthread-6:v    1    0.00    0.00    0.00   99.98       -    0.00    0.00   0.00   0.00    0.00    0.00
 36953     7799 vmx-vthread-7:v    1    0.00    0.00    0.00   99.98       -    0.00    0.00   0.00   0.00    0.00    0.00
 36959     7799 vmx-mks:vm0-net    1    0.01    0.01    0.00   99.96       -    0.01    0.00   0.00   0.00    0.00    0.00
 36960     7799 vmx-svga:vm0-ne    1    0.00    0.00    0.00   99.98       -    0.00    0.00   0.00   0.00    0.00    0.00
 36961     7799 vmx-vcpu-0:vm0-    1   65.64   66.39    0.00   33.58    1.13    0.01   32.45   0.32   0.00    0.00    0.00
 36962     7799 vmx-vcpu-1:vm0-    1   64.89   65.65    0.00   34.30    1.09    0.03   33.20   0.34   0.00    0.00    0.00
  7815     7815 vm1-netperf-x64    9  136.58  113.04   30.18  786.69    3.76    0.08   83.22   0.86   0.00    0.00    0.00
```

A virtual machine consists of more than vCPU worlds.

TURBO BOOST

ID	GID	NAME	NWLD	%USED	%RUN	%SYS	%WAIT	%VMWAIT	%RDY	%IDLE
10829732	10829732	win2012	16	2.47	5.08	0.03	1600.00	0.10	0.04	798.56
10882898	10882898	windows10vm	12	404.65	402.10	0.00	803.19	0.00	0.01	0.00
1751906	12684175	vmx	1	0.01	0.01	0.01	100.00	-	0.00	0.00
1751908	12684175	NetWorld-VM-175	1	0.00	0.00	0.00	100.00	-	0.00	0.00
1751909	12684175	NUMASchedRemapE	1	0.00	0.00	0.00	100.00	-	0.00	0.00
1751910	12684175	vmast.1751907	1	0.06	0.12	0.00	100.00	-	0.00	0.00
1751912	12684175	vmx-vthread-6	1	0.00	0.00	0.00	100.00	-	0.00	0.00
1751913	12684175	vmx-mks:win2k8-	1	0.00	0.01	0.00	100.00	-	0.00	0.00
1751915	12684175	vmx-svga:win2k8	1	0.00	0.00	0.00	100.00	-	0.00	0.00
1751917	12684175	vmx-vcpu-0:win2	1	130.91	100.32	0.00	0.12	0.00	0.00	0.12
1751919	12684175	vmx-vcpu-1:win2	1	128.18	100.44	0.00	0.00	0.00	0.00	0.00
1751918	12684175	LSI-1751907:0	1	0.01	0.02	0.00	100.00	-	0.00	0.00

READY TIME

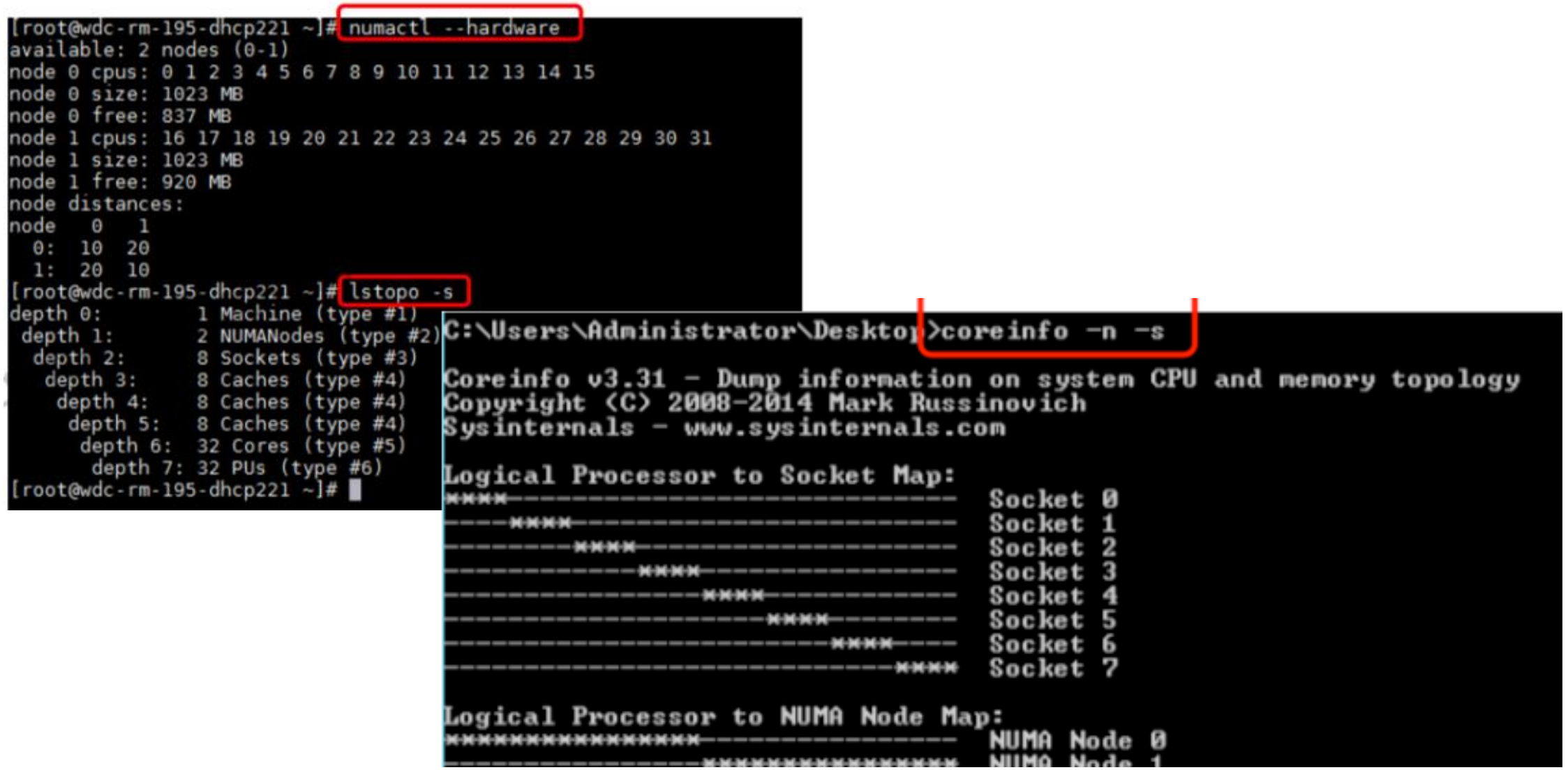
128 vCPUs!!

ID	GID	NAME	NWLD	%USED	%RUN	%SYS	%WAIT	%VMWAIT	%RDY	%IDLE	%OVRLP
16043	16043	vm0-kernel-comp	138	247.48	373.24	8.85	13408.74	194.11	23.91	12215.00	35.3

ID	GID	NAME	NWLD	%USED	%RUN	%SYS	%WAIT	%VMWAIT	%RDY	%IDLE	%OVRLP
2101942	16043	vmx	1	10.77	0.01	10.76	99.85	-	0.00	0.00	0.00
2101945	16043	NUMASchedRemapE	1	0.00	0.01	0.00	99.83	-	0.02	0.00	0.01
2101946	16043	vmast.2101943	1	0.12	0.22	0.00	99.64	-	0.00	0.00	0.00
2102074	16043	vmx-vthread-132	1	0.00	0.00	0.00	99.86	-	0.00	0.00	0.00
2102075	16043	vmx-filtPoll:vm	1	0.00	0.00	0.00	99.85	-	0.01	0.00	0.00
2102076	16043	vmx-vthread-134	1	0.00	0.00	0.00	99.86	-	0.00	0.00	0.00
2102077	16043	vmx-vthread-135	1	0.00	0.00	0.00	99.86	-	0.00	0.00	0.00
2102078	16043	vmx-mks:vm0-ker	1	0.13	0.27	0.00	99.58	-	0.01	0.00	0.00
2102079	16043	vmx-svga:vm0-ke	1	0.14	0.18	0.00	99.62	-	0.06	0.00	0.00
2102080	16043	vmx-vcpu-0:vm0-	1	3.31	4.32	0.00	95.48	0.01	0.06	95.46	0.23
2102082	16043	vmx-vcpu-1:vm0-	1	1.69	2.43	0.00	96.87	1.30	0.55	95.57	0.24
2102083	16043	vmx-vcpu-2:vm0-	1	1.62	2.48	0.00	96.80	1.24	0.58	95.56	0.29
2102084	16043	vmx-vcpu-3:vm0-	1	1.84	2.60	0.00	96.91	1.20	0.35	95.71	0.25
2102085	16043	vmx-vcpu-4:vm0-	1	1.98	2.49	0.00	97.08	1.26	0.28	95.83	0.15
2102086	16043	vmx-vcpu-5:vm0-	1	1.81	2.55	0.00	96.80	1.24	0.50	95.56	0.32
2102087	16043	vmx-vcpu-6:vm0-	1	1.85	2.73	0.00	96.91	1.25	0.22	95.66	0.27
2102088	16043	vmx-vcpu-7:vm0-	1	1.75	2.43	0.00	96.87	1.26	0.56	95.61	0.15
2102089	16043	vmx-vcpu-8:vm0-	1	1.80	2.59	0.00	96.75	1.25	0.52	95.50	0.25
2102090	16043	vmx-vcpu-9:vm0-	1	1.79	2.64	0.00	96.85	1.19	0.37	95.66	0.25
2102091	16043	vmx-vcpu-10:vm0	1	1.80	2.56	0.00	96.84	1.19	0.46	95.65	0.21
2102092	16043	vmx-vcpu-11:vm0	1	1.85	2.64	0.00	96.77	1.24	0.45	95.52	0.21
2102093	16043	vm								5.63	0.09
2102094	16043	vm								5.52	0.22
2102095	16043	vm								5.51	0.21

Group (VM) stats aggregate world stats.

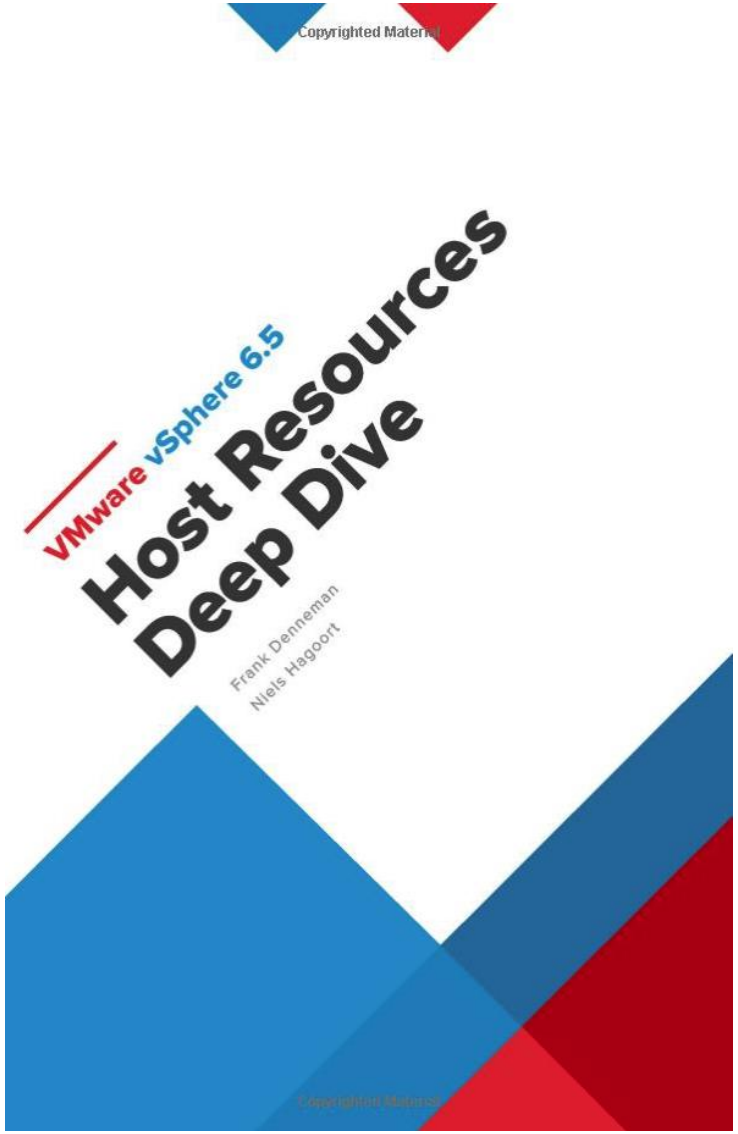
NUMA



I DONT NEED IT...

PERFORMANCE TUNING

HOST RESOURCES DEEP DIVE



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QUESTIONS?