

Unix Workshop for DBAs – Part 3: HP-UX

- München, Oktober 2008

UNIX Workshop für DBAs – 3 Teile

1

Storage

- SAN/NAS
- RAID/SAME/ASM
- MSA/EVA
- Performance, Monitoring

2

Linux

- Booting, Netzwerk (Konfiguration, TCP/IP, Tracing, Bonding), Prozesse (Tracing: strace), I/O Scheduling, Packages, LVM, Raw Devices, VLM, Hugepages, Memory Management, Monitoring, cron, Kernel-Modules, SSH

3

HP-UX

- Memory Management, Kernel Parameters, Mount Options, LVM, Filesystem, Monitoring, Shell Scripting, Networking, APA, Oracle Specifics

Inhalt – Part 3: HP-UX

1. Memory Management
2. Kernel Parameters
3. Networking
4. Filesysteme / Mount Options
5. LVM
6. Monitoring
7. Oracle Specifics
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1. Memory Management – Swap / Paging / Swapping / Deactivations (1)

Swap:

- Im Gegensatz zu Linux wird für jeden Prozess die benötigte Menge an Memory reserviert. z.B. Prozess mit 1024MB Memory Utilization benötigt 1024 MB RAM und 1024 MB Swap.
- Stehen zwar 2048 MB RAM aber nur 512 MB Swap zur Verfügung, kann der Prozess nicht erstellt werden.
 - `Jan 30 18:00:17 myhost1 sshd[1287]: error: fork: Not enough space`
- Empfehlung: SWAP = RAM + 10% (bei sehr viel RAM sind 5% OK)
- Monitoring über `glance (w)` oder `/usr/sbin/swapinfo -t`

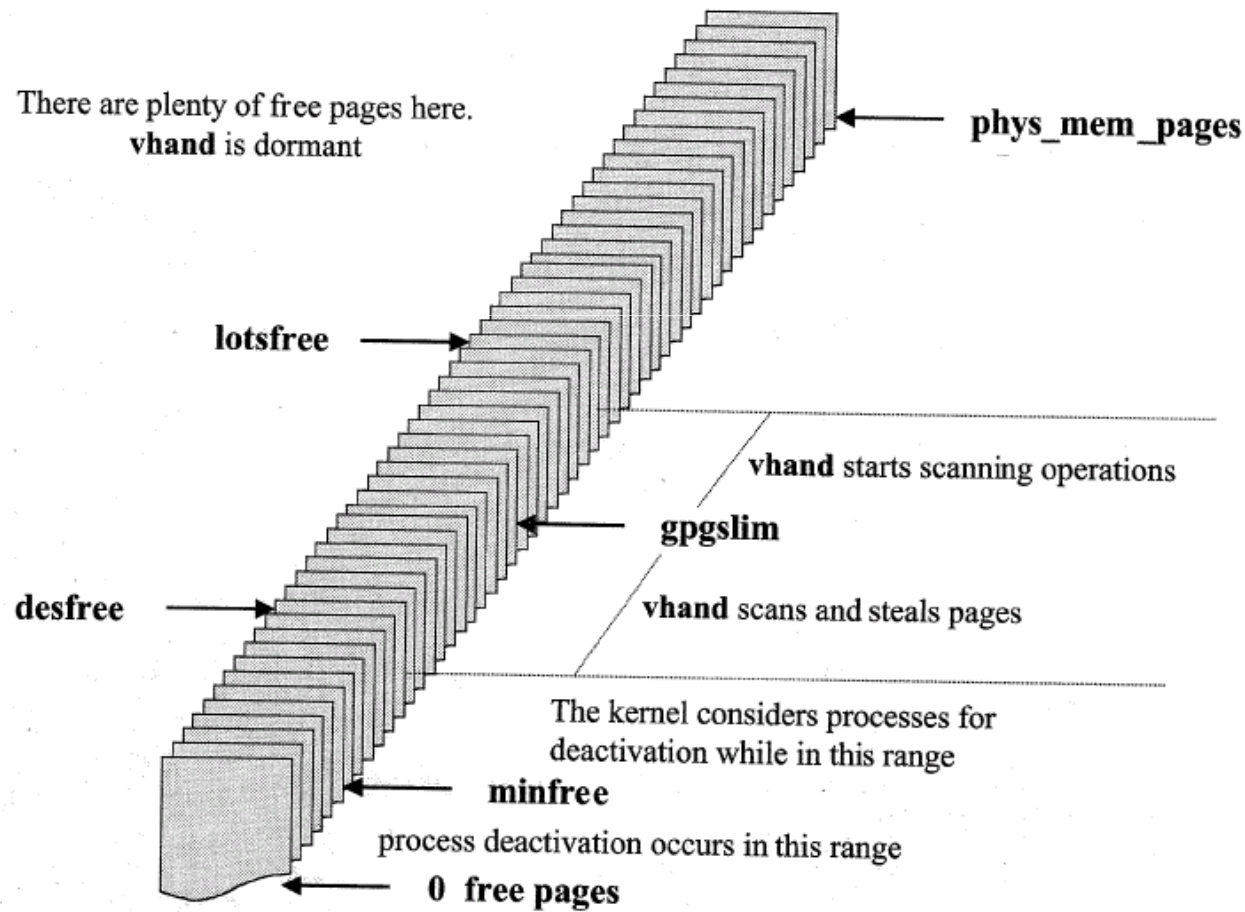
Paging:

- einzelne, länger nicht mehr genutzte Speicherseiten von Prozessen werden aus dem RAM gepaged (`vmstat: page out - po`)
- ganz normal

Swapping: (bei HP-UX: Deactivations)

- Komplette Prozesse werden aus dem RAM entfernt und in Swap ausgelagert.
- Träge, sehr I/O intensiv, letzter Ausweg (`vmstat -S: swapped out – so`)

1. Memory Management – Paging/Swapping (2)



1. Memory Management – Paging/Swapping (3)

Tool: freemem (/oracle/MYDB/dba/performance/freemem) untersucht Memory-Werte

Beispiel: myhost1:

```
11:07:24 freemem= 914670  gpgslim= 15360  lotsfree= 65536  desfree= 15360  
      bufpages= 292870  dbcmipgs= 292870  dbcmxpgs= 292870  minfree= 7424
```

Die Werte beziehen sich auf pages (*4096 Bytes).

```
freemem=          3572 MB  (variiert ständig) => free page count  
gpgslim=          60 MB   (variiert ständig) => variiert zw. lotsfree und desfree  
lotsfree=        256 MB   (konstant) => je nach physischem Memory  
desfree=          60 MB   (konstant) => je nach physischem Memory  
bufpages=        1144 MB  (konstant) => Filesystem Buffer  
dbcmipgs=        1144 MB  (konstant) => Filesystem Buffer  
dbcmxpgs=        1144 MB  (konstant) => Filesystem Buffer  
minfree=         29 MB   (konstant)
```

*) MB Angaben sind nur Richtwerte und gelten nur für Systeme mit ca. 16 GB RAM

1. Memory Management – Paging/Swapping (4) - Beispiel

Myhost1 \$./freemem_hpux

freemem= 411793 gpgslim= 50176 lotsfree= 204800 **desfree=50176** bufpages= 544759 dbcmminpgs=
544759 dbcmmaxpgs= 544760 minfree= 24832 for info: freemem -help

vmstat 1

r	b	w	avm	free	re	at	pi	po	fr	de	sr	in	sy	cs	us	sy	id
134	2	0	3367277	51040	60	0	6	0	0	0	0	8434	35740	2894	16	84	0
134	2	0	3367277	50793	52	0	4	0	0	0	0	8209	31907	2758	8	92	0
134	2	0	3367277	50681	61	0	5	0	0	0	0	8492	31989	2954	11	89	0
134	2	0	3367277	50519	62	0	4	0	0	0	0	8285	30375	2789	6	94	0
134	2	0	3367277	50387	62	0	3	0	0	0	0	8303	44994	2804	7	93	0
134	2	0	3367277	50241	61	0	3	0	0	0	0	8336	42156	2819	12	88	0
procs			memory				page				faults				cpu		
r	b	w	avm	free	re	at	pi	po	fr	de	sr	in	sy	cs	us	sy	id
134	2	0	3367277	50178	60	0	3	6	5	0	3385	8791	41985	3078	22	78	0
134	2	0	3367277	50163	54	0	3	34	16	0	3625	9286	43441	3333	25	75	0
134	2	0	3367277	50193	49	0	3	65	12	0	3038	10113	44151	3790	18	82	0
134	2	0	3367277	50339	54	3	5	111	9	0	2435	9349	39964	3422	18	82	0
113	5	0	3472697	50210	56	2	4	147	8	0	1948	9141	37222	3275	22	78	0
113	5	0	3472697	50160	144	6	10	143	6	0	1558	9298	57079	3443	18	82	0
113	5	0	3472697	50148	241	11	23	166	3	0	1007	9161	87101	3410	7	93	0

- Wenn freier Speicher > desfree, dann erscheinen keine Werte unter vmstat "scan rate (sr)", aber trotzdem ist das System mit Memory Management beschäftigt.
- Wenn freier Speicher < desfree, dann wird die Belastung durch Memory Management höher.

1. Memory Management - Pagesize (4)

- Oracle Database 10g changes the default setting for virtual memory data pages from D (4KB) to L (4 GB) on HP-UX systems (vgl. mit Hugepages für Linux)
- With the lowest page size setting (4 KB), CPU utilization can be 20 percent higher than that with a larger page size setting. **With the highest setting of L, the memory utilization can be 50 percent higher than that with a 4 MB setting.** In cases where the system shows memory constraints, Oracle recommends that you set the page size to match the requirements of the particular application, within the constraints of available memory resources.
- For example, an application that has problems with the L setting may show reasonable performance with a 4 MB virtual memory page setting. (http://download-uk.oracle.com/docs/cd/B19306_01/server.102/b15658/appb_hpux.htm#sthref815)

- ```
/usr/bin/chatr $ORACLE_HOME/bin/oracle
/oracle/MYSID/10.2.0/bin/oracle:
 64-bit ELF executable
 index type address flags size
 7 text 4000000000000000 z---c- 64M
 8 data 6000000000000000 ---m-- L (largest possible)
```
- ```
./rdbms/lib/env_rdbms.mk:
LARGE_PAGE_FLAGS=`if /usr/bin/getconf KERNEL_BITS | $(GREP) "64" > /dev/null ; \
then echo "-Wl,+pi,64M -Wl,+pd,L -Wl,+padtext,16M -Wl,+paddata,1M" ; \
else echo "" ; fi`
```


2. Kernel - Parameters

- Anzeigen mit: `/usr/sbin/kmtune -l`
- Persistent in `/stand/system`

Parameter, um System Memory (Kernel, etc.) zu verringern:

- **Buffer Cache:** `dbc_min_pct`, `dbc_max_pct` (200 MB für OS plus 200 - 300 MB pro Oracle Instanz)
- **nfile:** maximum number of files that can be open simultaneously on the system at any given time
- **ncsize:** Number of Directory Name Lookup Cache (DNLC) entries (ausser VxFS)
- **ninode:** nur relevant für HFS Inode Cache. Wenn kein HFS verwendet wird kann der Parameter sehr klein gehalten werden
- **vx_ninode:** relevant für JFS Inode Cache. Soll explizit gesetzt werden (zw. 20.000 und 30.000 setzen)
- **vx_bc_bufhwm:** Soll auf 10% des Buffer Cache (`dbc_min/max_pct`) gesetzt werden.

Sonstige Parameter:

- **shmmax:** Maximale Größe EINES shared Memory Segments, wenn `SGA > shmmax`, dann mehrere Segmente (Performance-Nachteil)
- **max_async_ports** (default 50) = 335 auf RAC Nodes mit Raw Devices und async IO

Der Wert 335 ist folgendermaßen berechnet: `max_async_ports` limits the maximum number of processes that can concurrently. use `/dev/async`. Set this parameter to the sum of 'processes' from `init.ora` + number of background processes (Nur für Raw-Devices Datenbanken)

3. Networking – Interfaces (1)

- Überblick über konfigurierte Netzwerk-Interfaces sowie Fehler

```
$ /oracle/MYDB/oratrace/bdump netstat -inw
```

Name	Mtu	Network	Address	Ipkts	Ierrs	Opkts	Oerrs	Coll
lan900:801	1500	10.128.17.0	10.128.17.35	38776	0	0	0	0
lan3	1500	192.168.56.0	192.168.56.32	1469718	0	2765317	0	0
lan2	1500	10.224.26.0	10.224.26.32	11959270	0	2373477	0	0
lan900:802	1500	10.224.17.0	10.224.17.34	11019468	0	186285	0	0
lo0	4136	127.0.0.0	127.0.0.1	39444544	0	39444585	0	0
clic1	31744	192.168.0.0	192.168.0.1	9225729	0	12188	0	0
clic0	31744	192.168.0.0	192.168.0.2	5886752	0	17241891	0	0
lan900	1500	10.128.17.0	10.128.17.32	2582834	0	15763420	0	0

3. Networking – Routing-Table / Interfaces (2)

- Überblick über konfigurierte Netzwerk-Interfaces sowie Routing Table

```
$ netstat -nr  
Routing tables
```

Destination	Gateway	Flags	Refs	Interface	Pmtu
127.0.0.1	127.0.0.1	UH	0	lo0	4136
default	10.240.5.24	UG	0	lan900	0

3. Networking – Interface-Konfiguration (3)

- Interface Konfiguration

```
$ /usr/sbin/ifconfig lan901:1
lan901:1: flags=1843<UP,BROADCAST,RUNNING,MULTICAST,CKO>
    inet 10.128.252.3 netmask ffffffff broadcast 10.128.252.255
```

- Interface Konfiguration

```
$ /usr/sbin/lanscan -v
```

```
Hardware Station          Crd Hdw   Net-Interface  NM  MAC          HP-DLPI DLPI
Path      Address          In# State NamePPA      ID  Type         Support Mjr#
LinkAgg0  0x00156004B8F4  900 UP     lan900 snap900  11  ETHER        Yes     119
```

```
Extended Station          LLC Encapsulation
Address                   Methods
0x00156004B8F4           IEEE HPEXTIEEE SNAP ETHER NOVELL
```

Driver Specific Information

hp_apa

```
.....
Hardware  Crd Hdw   Net-Interface  NM  MAC          HP-DLPI DLPI Driver
Path      In# State NamePPA      ID  Type         Support Mjr# Name
-----
0/1/2/0   0  UP    lan0 snap0      1  ETHER        Yes     119  iether
0/3/1/0   3  UP    lan3 snap3      4  ETHER        Yes     119  iether
```

3. Networking – Interface-Konfiguration (4)

- Interface Konfiguration – Full/Half Duplex, Autoneg On/off

```
$ /usr/sbin/lanadmin -x 0 # für LAN0  
Speed = 1000 Full-Duplex.  
Autonegotiation = On.
```

```
$ /usr/sbin/lanadmin  
Enter command: lan  
LAN Interface test mode. LAN Interface PPA Number = 0  
Enter command: display
```

```
LAN INTERFACE STATUS DISPLAY  
Wed, May 30, 2007 08:05:47
```

```
PPA Number                = 0  
Description                = lan0 HP PCI-X 1000Base-T Release B.11.23.0606.01  
Type (value)              = ethernet-csmacd(6)  
MTU Size                  = 1500  
Speed                     = 1000000000  
Station Address           = 0x156004b8ef  
Administration Status (value) = up(1)  
Operation Status (value)  = up(1)  
Last Change               = 100  
Inbound Octets            = 2854440390  
Inbound Unicast Packets   = 1243737460  
Inbound Non-Unicast Packets = 137398  
Inbound Discards          = 0  
Inbound Errors            = 0  
Outbound Octets           = 2691167792  
Outbound Unicast Packets  = 619010319  
Outbound Non-Unicast Packets = 13502  
Outbound Discards         = 0  
Outbound Errors           = 0  
Outbound Queue Length    = 1
```

3. Networking – Auto Port Aggregation (APA) (5)

- Mehrere physikalische Netzwerk-Interfaces werden zu einem logischen Interface gebündelt und mit EINER IP Adresse (und einer MAC Adresse) angesprochen.
- Voraussetzung: Switch muss das unterstützen (IEEE 802.3ad oder Cisco PAgP)
- Konfiguration: /etc/rc.config.d/hp_apacnf
- unterstützt Load Balancing (HP_APA_LOAD_BALANCE) und High Availability (HP_APA_HOT_STANDBY)

Beispiel:

```
HP_APA_INTERFACE_NAME[0]=lan900
```

```
HP_APA_HOT_STANDBY[0]=on
```

```
HP_APA_MANUAL_LA[0]="0,3"
```

```
HP_APA_INTERFACE_NAME[1]=lan901
```

```
HP_APA_HOT_STANDBY[1]=on
```

```
HP_APA_MANUAL_LA[1]="2,4"
```

3. Networking – HyperFabric (6)

- HyperFabric is a high-speed network link that runs on various HP systems running HP-UX. HyperFabric supports Hyper Messaging Protocol (HMP) and the IP network protocol stack (TCP/IP/UDP).
- To align with the market trend for standards-based interconnects, **Oracle 10g RAC database is not currently supported on configurations consisting of HyperFabric product suite and it will not be supported in the future either. As a result, customers must switch to Gigabit Ethernet, 10Gigabit Ethernet or Infiniband technology if they plan to use Oracle 10g RAC.** (<http://docs.hp.com/en/B6257-90055/ch01s01.html?btnNext=next%A0%BB>)
- **Oracle MetaLink: Is HMP supported with 10g on all HP platforms ?**
- 10g RAC + UDP + Itanium = yes (even over Hyperfabric)
- eigene Hardware (Adapters und Switches)
- Vorteil: lower latency, less CPU usage

Beispiel: pbupdb1: /usr/sbin/lanscan -v

Hardware Path	Station Address	Crd In#	Hdw State	Net-Interface NamePPA	NM ID	MAC Type	HP-DLPI Support	DLPI Mjr#
0/3/1/0	0x00000000	0	UP	clic0	5	HyperFabric	No	*

Hardware Path	Station Address	Crd In#	Hdw State	Net-Interface NamePPA	NM ID	MAC Type	HP-DLPI Support	DLPI Mjr#
0/4/1/0	0x00000000	1	UP	clic1	6	HyperFabric	No	*

4. Filesysteme / Mount Options (1)

- Persistent mit /etc/fstab:

```
# vg_ora1
/dev/vg_ora1/lvol1 /oracle/MYSID vxfs delaylog 0 2
/dev/vg_ora1/lvol2 /oracle/MYSID/oraarch/hadb_1 vxfs delaylog 0 2
/dev/vg_ora1/lvol3 /oracle/MYSID/oratrace vxfs delaylog 0 2
/dev/vg_ora1/lvol4 /oracle/MYSID/oradata vxfs convosync=direct 0 2
/dev/vg_ora1/lvol5 /oracle/MYSID/origlogA vxfs convosync=direct 0 2
```

- vxfs von HP heisst: HP Online JFS
- Mount Options: (man mount_vxfs)

convosync=direct convosync=direct|dsync|unbuffered|closesync|delay
Alters the caching behavior of the file system for O_SYNC
and O_DSYNC I/O operations. Optimal für Oracle I/O aber schlecht für OS I/O (zB. cp, exp, etc.)

datainlog|nodatainlog
Generally, VxFS does O_SYNC or O_DSYNC writes by logging
the data and the time change to the inode (datainlog).
If the nodatainlog option is used, the logging of
synchronous writes is disabled; O_SYNC writes the data
into the file and updates the inode synchronously before
returning to the user.

Note: The datainlog option is available only with the HP
OnLineJFS product.

4. Filesysteme / VxFS Tuning (2)

noatime Directs the file system to ignore file access time updates except when they coincide with updates to ctime or mtime (see the stat(2)) manual page. By default, the file system is mounted with access time (atime) recording. You can use the noatime option to reduce disk activity on file systems where access times are not important.

- Derzeitige Mounts und Options sieht man mit: /usr/sbin/mount
- VxFS Tuning: (man vxtunefs)

discovered_direct_iosz

Any file I/O requests larger than the `discovered_direct_iosz` are handled as discovered direct I/O. A discovered direct I/O is unbuffered like direct I/O, but it does not require a synchronous commit of the inode when the file is extended or blocks are allocated. For larger I/O requests, the CPU time for copying the data into the buffer cache and the cost of using memory to buffer the I/O becomes more expensive than the cost of doing the disk I/O. For these I/O requests, using discovered direct I/O is more efficient than regular I/O. The default value of this parameter is 256K.

4. Filesystem / VxFS Tuning (3)

EXAMPLES

If you have a four column striped volume, /dev/vx/dsk/datadb/db03, with a stripe unit size of 128 kilobytes per disk, set the read_pref_io and read_nstream parameters 128 and four, respectively.

z.B. /dev/vx/dsk/datadg/db03 read_pref_io=128k,read_nstream=4

read_nstream

The number of parallel read requests of size read_pref_io to have outstanding at one time. The file system uses the product of read_nstream and read_pref_io to determine its read ahead size. The default value for read_nstream is 1.

read_pref_io

The preferred read request size. The file system uses this in conjunction with the read_nstream value to determine how much data to read ahead. The default value is 64K.

z.B. LMDWH: cat /etc/vx/tunefstab

```
/dev/vg_lmdwh/lvol6 discovered_direct_iosz=128k
/dev/vg_lmdwh/lvol6 read_pref_io=64k
/dev/vg_lmdwh/lvol6 read_nstream=1
/dev/vg_lmdwh/lvol7 discovered_direct_iosz=128k
/dev/vg_lmdwh/lvol7 read_pref_io=64k
/dev/vg_lmdwh/lvol7 read_nstream=1
```

5. LVM (Logical Volume Manager) (1)

- Commands:
 - /usr/sbin/vgdisplay, /usr/sbin/pvdisplay, /usr/sbin/lvdisplay
- Freier Platz in Diskgroup (Achtung: RAID1: nur 50% Netto)

```
$ /usr/sbin/vgdisplay /dev/vg_mydg
--- Volume groups ---
VG Name                /dev/vg_mydb
VG Write Access        read/write
VG Status               available, shared, server
Max LV                 255
Cur LV                80
Open LV                79
Max PV                 128
Cur PV                2
Act PV                 2
Max PE per PV          16383
VGDA                   4
PE Size (Mbytes)      32
Total PE            6652
Alloc PE            6614
Free PE             38
```

5. LVM (Logical Volume Manager) (2)

- Problem mit Prefetch Mechanismus bei LVM Mirroring auf HP-UX
- Workaround: Schedule: sequential statt parallel
 - Liest nur von erstem Mirror
 - Schreibt hintereinander zuerst auf ersten Mirror, dann auf zweiten Mirror
 - Vorteil: Prefetching von Storage kann ausgenutzt werden
 - Nachteil: Write Zeit verdoppelt sich, wenn write Storage Cache zu klein

```
$ bdf
Filesystem          kbytes    used    avail %used Mounted on
/dev/vg_mydg/lvol6  2147450880 2122569016 24687480    99% /oracle/MYDB/oradata
/dev/vg_mydg/lvol7  1151336448 1127623376 23527816    98% /oracle/MYDB/oradata2

$ /usr/sbin/lvdisplay /dev/vg_lmdwh/lvol7
--- Logical volumes ---
LV Name              /dev/vg_mydg/lvol7
VG Name              /dev/vg_mydg
LV Permission        read/write
LV Status            available/syncd
Mirror copies        1
Consistency Recovery MWC
Schedule          sequential    (default: parallel)
LV Size (Mbytes)     1124352
Current LE           35136
Allocated PE         70272
```

5. LVM (Logical Volume Manager) (3)

- Problem mit Prefetch Mechanismus bei LVM Mirroring, workaround:
 - oradata => **Lesen von 1. Storage Mirror**
 - oradata2 => **Lesen von 2. Storage Mirror**

```
/usr/sbin/lvdisplay -v /dev/vg_mydg/lvol6
```

```
--- Logical extents ---
```

LE	PV1	PE1	Status 1	PV2	PE2	Status 2
00000	/dev/dsk/c46t0d1	00900	current	/dev/dsk/c41t0d1	00900	current
00001	/dev/dsk/c65t0d2	02948	current	/dev/dsk/c57t0d2	02948	current
00002	/dev/dsk/c55t0d3	02948	current	/dev/dsk/c51t0d3	02948	current

```
/usr/sbin/lvdisplay -v /dev/vg_mydg/lvol7
```

```
--- Logical extents ---
```

LE	PV1	PE1	Status 1	PV2	PE2	Status 2
00000	/dev/dsk/c41t0d1	00901	current	/dev/dsk/c46t0d1	00901	current
00001	/dev/dsk/c57t0d2	00900	current	/dev/dsk/c65t0d2	00900	current
00002	/dev/dsk/c51t0d3	00900	current	/dev/dsk/c55t0d3	00900	current

5. LVM (Logical Volume Manager) - RAW Devices (4)

- `# /sbin/lvcreate -n test_sysaux_raw_800m -L 800 /dev/oracle_vg`
- Change the owner, group, and permissions on the character device files associated with the logical volumes that you created, as follows:
`# chown oracle:dba /dev/oracle_vg/r*`
`# chmod 755 /dev/oracle_vg`
`# chmod 660 /dev/oracle_vg/r*`
- `CREATE TABLESPACE TEST datafile '/dev/oracle_vg/rtest_sysaux_raw_800m' size 799M reuse autoextend off;`

6. Monitoring – glance (1)

- glance
 - g: Prozesse (sortieren über o, 1, dann sort key eintragen)
 - m: Memory Report: **Free Mem**
 - t: System Table (Model, CPUs, etc.)
 - w: Swap Space (Swap Util %)
 - d: Disk Report
 - i: IO By File System (Logical I/O, Physical I/O)
 - v: IO By Logical Volume (LV Reads, LV Writes)
 - u: IO By Disk
 - l: Network By Interface
- <http://h21007.www2.hp.com/dspp/files/unprotected/UsingGlance.pdf>
- `io2.conf:`

```
print gbl_stattime, gbl_cpu_total_util, gbl_disk_phys_read_rate ,
gbl_disk_phys_write_rate, gbl_disk_phys_read_byte_rate, gbl_disk_phys_write_byte_rate
```
- `nohup glance -aos ./io2.conf -j 60 > glance_output_$$$.txt 2>/dev/null &`

6. Monitoring – sar (2)

```
$ sar -d 1 100
```

```
HP-UX myhost1 B.11.23 U ia64 05/11/07
```

Time	device	%busy	avque	r+w/s	blks/s	avwait	avserv
15:45:32	device	%busy	avque	r+w/s	blks/s	avwait	avserv
15:45:33	c2t0d0	4.90	0.50	10	86	0.00	9.24
	c2t1d0	6.86	0.50	14	102	0.00	10.09
	c4t0d2	0.98	0.50	12	120	0.00	1.79
	c7t0d2	1.96	0.50	6	71	0.00	4.59
15:45:34	c2t0d0	4.00	0.50	5	80	0.00	12.41
	c2t1d0	4.00	0.50	7	88	0.00	12.77
15:45:35	c2t0d0	2.02	0.50	4	65	0.00	7.46
	c2t1d0	4.04	0.50	6	73	0.00	7.76
	c4t0d2	2.02	0.50	14	83	0.00	1.74
	c7t0d2	2.02	0.50	7	26	0.00	3.41
15:45:36	c2t0d0	1.98	0.50	3	34	0.00	9.27
	c2t1d0	2.97	0.50	5	42	0.00	8.84
	c4t0d2	0.99	0.50	11	123	0.00	1.05
	c7t0d2	0.99	0.50	5	69	0.00	1.91

LUN	Auslastung	durchschn. Queue	I/O/sec	512B/sec	Wait (Queue)	Service Zeit
		(>=0.5)				10-15 ms

7. Oracle Specifics

- HPUX_SCHED_NOAGE (Range:178 to 255)
Higher priorities are represented by lower values.
- Convosync=direct für oradata/origlogA/origlogB
- Filesystem Blocksize für oradata (8k) und origlogA (1k) und origlogB (1k)
(df -g => fragment size)
- VxFS unterstützt kein Async I/O, deshalb wird DISK_ASYNC_IO=TRUE ignoriert

8. Tips & Tricks

- STRG+Z stoppt interaktiven Prozess und kann mit "bg" in den Background oder "fg" in den Vordergrund geholt werden
- mit setzen der Umgebungsvariablen UNIX95=1 kann bei ps die XPG4 Syntax verwendet werden und manuell die Spalten selektiert werden:
UNIX95=1 ps -ef -o
- z.B. ps -ef -o pid,ppid,pcpu,sz (=physical size), vsz (Virtual Size in KB), comm
- nohup ./script_in_background.sh &
- Hardware-Information mit
\$ model
bzw.
\$ machinfo
- Prozess-Tracing mit tusc (Linux: strace)
- SCP Performance mit: scp -c arcfour128 <quelle> <destination host>:<destination path>/
- Patch Informationen: grep "patchnummer" /var/adm/sw/
- Patch Database: www.itrc.hp.com/ (Free registration)
- Logfiles: /var/adm/syslog/syslog.log (oder OLDSyslog.log), /var/adm/syslog/super.log

Referenzen

- HP IT Resource Center: <http://www1.itrc.hp.com>
- Buch: hp-ux 11i internals, chris cooper, chris moore
- <http://www.doag.org/pub/docs/sig/sap/2004-03/Dorer1.pdf>
- <http://h21007.www2.hp.com/dspp/files/unprotected/devresource/Docs/TechPapers/UXPerfCookBook.pdf>
- MetaLink Note:68105.1: Commonly Misconfigured HP-UX Kernel Parameters
- MetaLink Note: 217990.1:Init.ora Parameter "HPUX_SCHED_NOAGE" Reference
- MetaLink [Note 218027.1](#): HP SCHED_NOAGE Scheduling Policy to improve Performance for Oracle
- Oracle Database 10g changes the default setting for virtual memory data pages from D (4KB) to L (4 GB) on HP-UX systems
(http://download-uk.oracle.com/docs/cd/B19306_01/server.102/b15658/appb_hpux.htm#sthref815)
- <http://web.tampabay.rr.com/batcave/unixnotes.htm>

Fragen?

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