

“IT'S SLOW!” – NOW WHAT?



**Worldwide
Managed Services for
OpenVMS and Rdb**



Norman Lastovica
Phone: 603-879-9022
lastovica@sciinc.com
www.sciinc.com

Software Concepts International, LLC
30 Temple Street, Suite 303
Nashua, NH 03060, USA

The following is an entirely reasonable commitment to attempt to provide illumination and should be considered as such at the sole risk and discretion of the reviewer. The presenter, testimonials and examples will typically be erudite and exceptional. Expect to receive most of the data, most of the time. Any resultant insight may be incorporated in every day operations. Your mileage may vary. Errors, oversights and omissions are likely and are surely blamed on the author. The impossible may take longer.

Agenda

- ◆ Interact
- ◆ Interview
- ◆ Isolate
- ◆ Identify who / what / where



"It's Slow"

- ◆ The symptom too often
- ◆ Imprecise



The Usual Questions

Take Inventory

- ◆ What is “it”?
- ◆ Did “it” ever work?
- ◆ What Changed?
- ◆ Is “it” slow for all or just one?
- ◆ How slow is slow?
- ◆ How is it measured?
- ◆ How will we know if it is improved?



- ◆ Metrics - You need numbers
- ◆ How else to know if things improved?
- ◆ “Less is better” kinds
 - ◆ IO, locking, network, latency
- ◆ “More is better” kinds
 - ◆ TPS, Throughput

“Facts are stubborn things, but statistics are more pliable” - Mark Twain

Time

Regrettably, elapsed wall clock time alone isn't always overly helpful to us

Instead, first evaluate ratio of CPU to wall clock time



“Your assumptions are your windows on the world.
Scrub them off every once in a while, or the light
won't come in.” *-Isaac Asimov*

“A mind is like a parachute. It doesn't work if it is
not open.” *-Frank Zappa*



Where Computers Spend Time

- ♦ Executing useful instructions
- ♦ Waiting for...
 - ♦ Disk I/O
 - ♦ Network I/O
 - ♦ User I/O
 - ♦ CPU
- ♦ “Overhead”



Disk

- ◆ Response latency generally somewhere between .1ms and small values of forever
- ◆ Reads vs. Writes
- ◆ Caches
 - ◆ Write / Read
 - ◆ Controller vs. OS vs. Application



Storage

- ◆ Latency
 - ◆ Measured
 - ◆ Theoretical
 - ◆ Actual
- ◆ Bandwidth
 - ◆ Measured
 - ◆ Theoretical
 - ◆ Actual



Collect Information

- ◆ MONITOR MODE
- ◆ MONITOR IO
- ◆ MONITOR DISK
- ◆ MONITOR RMS
- ◆ MONITOR SYSTEM
- ◆ MON PROC
 - ◆ /TOPCPU
 - ◆ /TOPBIO
 - ◆ /TOPDIO



Collect Information

- ◆ SDA> CLUE CONFIG
- ◆ SHOW DEV D/MOUNT/FULL
- ◆ SHOW CLUSTER
- ◆ SHOW PROC/ACCOUNT
- ◆ SHOW PROC/CONTINUOUS
- ◆ SDA> PRF
- ◆ SDA> PCS
- ◆ PCA



Collect Information

- ◆ RMU /SHOW ...
 - ◆ LOGICAL
 - ◆ SYSTEM
 - ◆ STAT



SHOW PROC /ACCOUNT

◆ CPU or IO bound?

Accounting information:

Buffered I/O count:	4968452	Peak working set size:	15200
Direct I/O count:	377240	Peak virtual size:	186224
Page faults:	1261	Mounted volumes:	0
Elapsed CPU time:	0 00:02:54.93		
Connect time:	54 17:50:58.73		

Accounting information:

Buffered I/O count:	445745	Peak working set size:	71616
Direct I/O count:	30511690	Peak virtual size:	246928
Page faults:	9329	Mounted volumes:	1
Charged CPU time:	0 13:25:40.75	Elapsed time:	0 09:29:53.80

MONITOR PROCESS

TOP DIRECT I/O RATE PROCESSES 22-OCT-2013 11:56:04.10

			0	250	500	750	1000
			+ - - - -	+ - - - -	+ - - - -	+ - - - -	+ - - - -
00071CDD	IO Test \$DGA510	3038	aa				
0011916F	DFG\$DB_BACKUP	1797	aa				
001BB904	RDBSERVER_25010	496	aaaaaaaaaaaaaaaaaaaaa				
0008396A	RDBSERVER_25097	327	aaaaaaaaaaaaa				
00143885	RDBSERVER_24899	259	aaaaaaaaaaa				
001EE8FF	RDBSERVER_25005	224	aaaaaaa				
000D302A	RDBSERVER_8436	161	aaaaaa				
0008283D	RDBSERVER_16645	131	aaaaa				
0011591C	RDBSERVER_25034	123	aaaa				
000F0297	RDBSERVER_25596	120	aaa				

MONITOR IO

I/O SYSTEM STATISTICS 1-OCT-2014 04:11:01.79

	CUR	AVE	MIN	MAX
Direct I/O Rate	553.48	512.71	390.53	594.13
Buffered I/O Rate	8.99	10.32	8.99	11.99
Mailbox Write Rate	0.00	0.11	0.00	0.33
Split Transfer Rate	4.33	4.22	3.99	4.33
Log Name Translation Rate	1.99	4.33	1.99	6.33
File Open Rate	0.66	0.22	0.00	0.66
Page Fault Rate	0.00	1.77	0.00	3.33
Page Read Rate	0.00	0.11	0.00	0.33
Page Read I/O Rate	0.00	0.11	0.00	0.33
Page Write Rate	0.00	0.00	0.00	0.00
Page Write I/O Rate	0.00	0.00	0.00	0.00
Inswap Rate	0.00	0.00	0.00	0.00
Free List Size	169087.00	169088.33	169087.00	169091.00
Modified List Size	11903.00	11903.00	11903.00	11903.00

MON STATE

```
+-----+
|  CUR  |
+-----+
```

PROCESS STATES
on node STAR3
1-OCT-2014 04:20:36.44

	0	10	20	30	40
	+ - - - - + - - - - + - - - - + - - - - +				
Collided Page Wait					
Mutex & Misc Resource Wait	3	aaa			
Common Event Flag Wait					
Page Fault Wait					
Local Event Flag Wait	33	aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa			
Local Evt Flg (Outswapped)					
Hibernate	71	aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa			
Hibernate (Outswapped)					
Suspended					
Suspended (Outswapped)					
Free Page Wait					
Compute	1	a			
Compute (Outswapped)					
Current Process	2	aa			
	+ - - - - + - - - - + - - - - + - - - - +				

Overhead

- ◆ Spinlocks
- ◆ Locks
- ◆ Kernel
- ◆ Executive



Contention

◆ MONITOR MODE [/CPU]

+-----+		TIME IN PROCESSOR MODES				
CUR		on node WHOOPS				
+-----+		13-JUL-2009 16:28:47.02				
Combined for 32 CPUs		0	800	1600	2400	3200
		+ - - - -	+ - - - -	+ - - - -	+ - - - -	+
Interrupt State	101	a				
MP Synchronization	2150	aaaaaaaaaaaaaaaaaaaaaaaaaaaaa				
Kernel Mode	238	aa				
Executive Mode	456	aaaaa				
Supervisor Mode						
User Mode	138	a				
Idle Time	120	a				
		+ - - - -	+ - - - -	+ - - - -	+ - - - -	+

T4

- ◆ Install it!
 - ◆ Required for system performance analysis / trending
 - ◆ Suggest be configured and run on all systems
- ◆ Run with default collection interval of 1 minute
- ◆ TLViz data visualizer mandatory



T4

Database backup job run at just after 14:00! IO and locking spike in middle of business day



T4 Retains Monitor Data

```
$ mon proc/topc -  
/input=t4_star4_31jul2014_1410_0000_mon.dat /view=1
```

```
OpenVMS Monitor Utility  
TOP CPU TIME PROCESSES  
on node STAR4
```

```
31-JUL-2014 14:15:56.97
```

```
HP rx2620 (1.60GHz/3.0MB) (12287Mb with 2 cpu(s)).....
```

```
0          25          50          75          100  
+ - - - - + - - - - + - - - - + - - - - +
```

```
28600131 TCPIP$NTP_1  
2860017B MGR_OPCMON  
2860014F NMBD  
28600178 MGR_MONITOR  
2860015F DBA_MONITOR  
28600147 WBEM$CPQHEALTH  
28600138 TCPIP$SNMP_1  
28600128 TCPIP$PORTM_1
```



Find Hottest Files

◆ RMS Tracing

```
SDA> RMS START TRACE /BUFFER = 1024
```

```
SDA> RMS SHOW TRACE /SUMM
```

```
RMS Trace Information: (timestamp 27-FEB-2013 17:54:02.55, delta time 0 00:00:01.30)
```

```
-----  
TotEntries   Bucket-VBN       TotCount   Filename  
-----  
*      26801                                FOOD1: [L7742.V1.DATA]RULE.DAT;2  
  
                12987           2664  
                12603           2174  
                12663           2174  
                12962           1234
```

```
...
```

Find Hottest Files

- ◆ SHOW MEMORY/CACH=(VOL=*,TOPQ=10)

```
$show memory/cache=(volume=sys$sysdevice,topq)
...
_ $1$DGA2:[VMS$COMMON.SYSLIB]DECC$SHR.EXE;1 (26886, 2, 0) (open)
Caching is enabled, active caching mode is Write Through
  Allocated pages          375      Total QIOs          7666810
  Read hits                7666029   Virtual reads       7666810
  Virtual writes           0         Hit rate            99 %
  Read aheads              0         Read throughs       7666808

_ $1$DGA2:[VMS$COMMON.SYSLIB]LIBRTL.EXE;1 (26931, 2, 0) (open)
Caching is enabled, active caching mode is Write Through
  Allocated pages          13      Total QIOs          6263876
  Read hits                6263876   Virtual reads       6263876
  Virtual writes           0         Hit rate            99 %
  Read aheads              0         Read throughs       6263876

_ $1$DGA2:[VMS$COMMON.SYSEXE]SETP0.EXE;1 (26668, 2, 0) (open)
Caching is enabled, active caching mode is Write Through
  Allocated pages          5       Total QIOs          4378277
  Read hits                4378244   Virtual reads       4378277
  Virtual writes           0         Hit rate            99 %
```

SET PASSWORD
and SET MESSAGE

Whoops

- ♦ Hot files should rarely marked CACHE=NO

```
_$1$DGA10: (DISK$I64_V831H1), Caching mode is VIOC Compatible
_$1$DGA10: [VMSS$COMMON.SYSLIB]LIBRTL.EXE;1 (19024, 1, 0) (open)
Caching is enabled, active caching mode is No Caching
    Allocated pages          0      Total QIOs          604469269
    Read hits                0      Virtual reads       604469269
    Virtual writes           0      Hit rate          0 %
    Read aheads              0      Read throughs     0
    Write throughs           0      Read arounds      604469269
                                Write arounds           0

_$1$DGA10: [VMSS$COMMON.SYSEXEC]SEARCH.EXE;1 (18866, 1, 0) (open)
Caching is enabled, active caching mode is No Caching
    Allocated pages          0      Total QIOs          585328931
    Read hits                0      Virtual reads       585328931
    Virtual writes           0      Hit rate          0 %
    Read aheads              0      Read throughs     0
    Write throughs           0      Read arounds      585328931
                                Write arounds           0

_$1$DGA10: [VMSS$COMMON.SYSLIB]SMGSHR.EXE;1 (19046, 1, 0) (open)
Caching is enabled, active caching mode is No Caching
    Allocated pages          0      Total QIOs          507710537
    Read hits                0      Virtual reads       507710537
    Virtual writes           0      Hit rate          0 %
    Read aheads              0      Read throughs     0
    Write throughs           0      Read arounds      507710537
                                Write arounds           0
```



Cluster Costs

- ◆ PIPE SHOW SYSTEM/CLUSTER | SEARCH
SYS\$INPUT "RW "

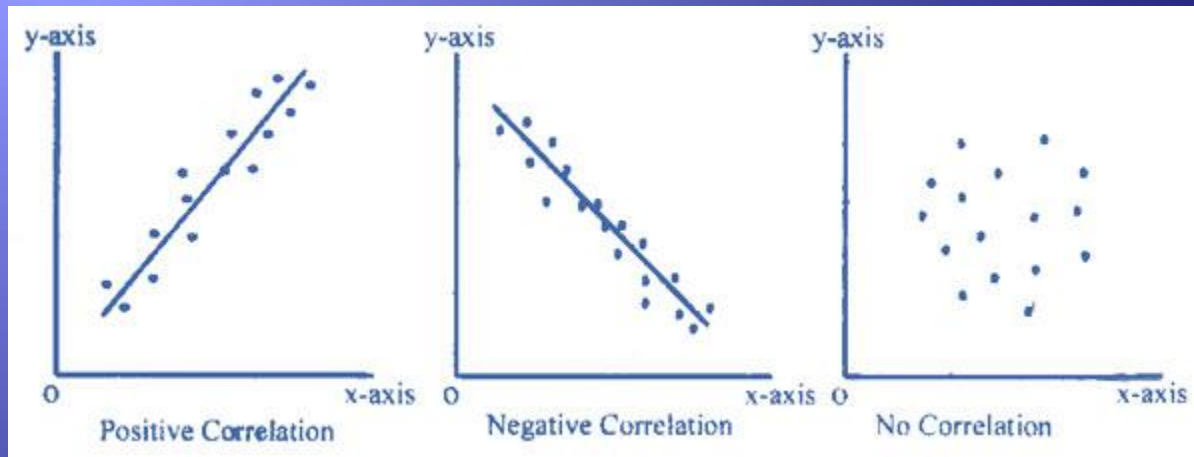
RWSCS state implies
remote locking indicates
impacting all nodes

```
$ sho sys/bat/clu ...
```

```
OpenVMS V8.4 on node ZING 7-JE 14 14:05:12.43 Uptime 17 03:02:17
```

Pid	Process Name	State	Pri	I/O	CPU	Page flts	Pages
20A0F4C0	T4\$V43_70001	HIB	6	2952	0 00:00:00.69	2377	228 B
20A12A59	BACKUP_6684	RWSCS	5	9274822	0 00:29:18.19	9815	7543 B

Correlation need not imply causation



Cluster Interconnect

- ◆ Cluster interconnect infrastructure expected to be running $\geq 1\text{GB}$

Device Characteristics EIB0 (28-FEB-2014 10:53:03.32):

Value	Characteristic
1500	Device buffer size
Normal	Controller mode
External	Internal loopback mode
00-17-A4-51-B7-B7	Default MAC address (Hardware LAN address)
	Multicast address list
Ethernet	Communication medium
FF-FF-FF-FF-FF-FF	MAC address (Current LAN address)
128	Minimum receive buffers
256	Maximum receive buffers
Yes	Full duplex enable
No	Full duplex operational
00-17-A4-51-B7-B7	MAC address (Current LAN address)
TwistedPair	Line media type
100	Line speed (mbps)
Enabled	Auto negotiation
Enabled	Flow control
Disabled	Jumbo frames
0	Failover priority
Link Up	Link state

MON DLOCK

DISTRIBUTED LOCK MANAGEMENT STATISTICS

on node STAR3

1-OCT-2014 03:59:59.31

		CUR	AVE	MIN	MAX
New ENQ Rate	(Local)	1371.54	1371.54	1371.54	1371.54
	(Incoming)	0.00	0.00	0.00	0.00
	(Outgoing)	0.00	0.00	0.00	0.00
Converted ENQ Rate	(Local)	1755.08	1755.08	1755.08	1755.08
	(Incoming)	0.99	0.99	0.99	0.99
	(Outgoing)	0.00	0.00	0.00	0.00
DEQ Rate	(Local)	1386.20	1386.20	1386.20	1386.20
	(Incoming)	0.00	0.00	0.00	0.00
	(Outgoing)	0.00	0.00	0.00	0.00
Blocking AST Rate	(Local)	0.66	0.66	0.66	0.66
	(Incoming)	0.00	0.00	0.00	0.00
	(Outgoing)	0.33	0.33	0.33	0.33
Dir Functn Rate	(Incoming)	0.00	0.00	0.00	0.00
	(Outgoing)	348.21	348.21	348.21	348.21
Deadlock Message Rate		0.00	0.00	0.00	0.00

SDA> LCK SHOW ACTIVE

Active Resource Tree Information (Node STAR3)

```

-----
RSB Address          Total    Local
                     Locks    Locks    SubRSB    Act    Node    Resource Name
-----
FFFFFFFF.787E4D00      1         1         0      498   STAR3   F11B$aBACKUPS      ....
FFFFFFFF.7865B840    3761      2303      3369    483   STAR3   F11B$vUSER
FFFFFFFF.78626A80      17         7         8      428   STAR3   F11B$vBACKUPS
FFFFFFFF.7862FC00      98        90        90       32   STAR3   F11B$vI64SYS-2
FFFFFFFF.7858C300      45        45         6       12   STAR3   SYS$SYS_ID.....
FFFFFFFF.78DB90C0       4         4         3       10   STAR3   RMS$.....SCRATCH    ...
                                DISK7:[T4$DATA]T4_STAR3_01OCT2014_MON.DAT;1
FFFFFFFF.78699480     34        34        31       7    STAR4   RMS$».à....USER      ...
                                DISK$USER:[CLUSTER.COMMON]SYSUAF.DAT;10
FFFFFFFF.78627200      62        57        57       3    STAR3   F11B$vORACLE
FFFFFFFF.78695C00     568        15       556       2    STAR3   F11B$vSCRATCH
FFFFFFFF.78A40A80     700       349      315       2    STAR3   Ý...D....USER        ...}...
                                DISK$USER:[DATABASE.RDB72]RDB72.RDB;1
FFFFFFFF.78741480     32         8        14       1    STAR3   RMS$bpgM....USER      ...
                                DISK$USER:[S.MGR.COMMON]MGRLOCKMGR.IDX;1

```


SDA> SHOW LOCK/WAIT/BRIEF

Lock Database

LKB Address	Lockid	ParentId	PID	BLKAST	SubLocks	RQ	GR	Queue	RSB Address	Resource Name	Mode
FFFFFFFF.7955C280	610007DF	00000000	0001002B	00000000	0	EX		Waiting	FFFFFFFF.78589C00	UCX\$INETACP_....	User
FFFFFFFF.79506E80	1B000A48	00000000	00010037	00000000	0	PR		Waiting	FFFFFFFF.786D5700	SQLSRV_.....RMU_SE0090001073	User
FFFFFFFF.79507B80	01000A49	00000000	0001003C	00000000	0	PR		Waiting	FFFFFFFF.786CF700	SQLSRV_.....SQLSRV_73000	User
FFFFFFFF.7956A680	01000A4B	00000000	0001003D	00000000	0	PR		Waiting	FFFFFFFF.786CF700	SQLSRV_.....SQLSRV_73000	User
FFFFFFFF.79576680	0A000B11	00000000	00010037	00000000	0	PR		Waiting	FFFFFFFF.786D66C0	SQLSRV_.....RMU_SE0090003073	User
FFFFFFFF.79576780	0B000B12	00000000	00010037	00000000	0	PR		Waiting	FFFFFFFF.786D7D40	SQLSRV_.....RMU_SE0090004073	User
FFFFFFFF.79576A80	1B000B15	00000000	00010037	00000000	0	PR		Waiting	FFFFFFFF.786D5840	SQLSRV_.....RMU_SE0090002073	User
FFFFFFFF.79576B80	01000B16	00000000	0001003A	00000000	0	PR		Waiting	FFFFFFFF.786CF700	SQLSRV_.....SQLSRV_73000	User
FFFFFFFF.79576E80	3D000B19	00000000	0001003E	00000000	0	PR		Waiting	FFFFFFFF.786CF700	SQLSRV_.....SQLSRV_73000	User
FFFFFFFF.79577280	47000B1D	00000000	0001003B	00000000	0	PR		Waiting	FFFFFFFF.786CF700	SQLSRV_.....SQLSRV_73000	User
FFFFFFFF.79577380	01000B1E	00000000	00010037	00000000	0	PR		Waiting	FFFFFFFF.786D7480	SQLSRV_.....RMU_DISP008073	User
FFFFFFFF.79577480	01000B1F	00000000	00010038	00000000	0	PR		Waiting	FFFFFFFF.786CF700	SQLSRV_.....SQLSRV_73000	User
FFFFFFFF.79577580	01000B20	00000000	00010037	00000000	0	PR		Waiting	FFFFFFFF.786D75C0	SQLSRV_.....SQLSRV_DIS003073	User
FFFFFFFF.79577780	0D000B22	00000000	00010039	00000000	0	PR		Waiting	FFFFFFFF.786CF700	SQLSRV_.....SQLSRV_73000	User
FFFFFFFF.79577B80	4A000B26	00000000	00010037	00000000	0	PR		Waiting	FFFFFFFF.786D6580	SQLSRV_.....GENERI0040002073	User



Who is doing Locking?

```
SDA> LCK LOAD
SDA> LCK START TRACE
SDA> LCK START COLL/PROC
```

...

```
SDA> LCK SHO COLL
```

Per-Process Lock Statistic Information: (collection running 1 seconds)

IPID	EPID	Process Name	Current Image	Lock Ops	Enqueues	Converts	Dequeues
00000000	28800400	NULL		938	143	4	791
00010055	28800455	DBA_MONITOR		675	332	13	330
00010053	28800453	WSI\$MANAGER	WSI\$MANAGER	22	11	0	11
0018007B	2880607B	RDM_ALS72_0001	RDMALS72	4	0	4	0
0021022E	2880862E	DBM_ALS72_1	DBMALS72	4	0	4	0



SDA> SHOW RESOURCES

◆ SHOW RESOURCES /CONTENTION

```
SDA> LCK SHOW CONTENTION /int=.1
```

```
Resource Contention Information:
```

Timestamp	LKB Address	Lockid	PID	GR	RQ	Queue	Resource Information
SDA>							
2-OCT 10:18:37	FFFFFFFF.798F8F80	09002B51	00330138	NL	PR	Convert	FFFFFFFF.78870080 B...=.
2-OCT 10:18:37	FFFFFFFF.798F8F80	09002B51	00330138	NL	PR	Convert	FFFFFFFF.78870080 B...=.
2-OCT 10:18:37	FFFFFFFF.798F8F80	09002B51	00330138	NL	PR	Convert	FFFFFFFF.78870080 B...=.
2-OCT 10:18:37	FFFFFFFF.798F8F80	09002B51	00330138	NL	PR	Convert	FFFFFFFF.78870080 B...=.
2-OCT 10:18:37	FFFFFFFF.798F8F80	09002B51	00330138	NL	PR	Convert	FFFFFFFF.78870080 B...=.
2-OCT 10:18:37	FFFFFFFF.798F8F80	09002B51	00330138	NL	PR	Convert	FFFFFFFF.78870080 B...=.
2-OCT 10:18:37	FFFFFFFF.798F8F80	09002B51	00330138	NL	PR	Convert	FFFFFFFF.78870080 B...=.
2-OCT 10:18:38	FFFFFFFF.798F8F80	09002B51	00330138	NL	PR	Convert	FFFFFFFF.78870080 B...=.

Where Is My Program Now?

```
SDA> set proc/ind=288004AF
```

```
SDA> read/exec
```

```
SDA> sho call/sum
```

```
Call Frame Summary
```

```
-----
```

Frame Type	(mode)	Handle	Current PC	

Memory Stack Frame	(U)	000007FD.BFFD4A20	FFFFFFFF.805F2F90	SYS\$HIBER_C+002E0
Memory Stack Frame	(U)	000007FD.BFFD49B8	FFFFFFFF.9C520670	ORACLE+0ADE8670
Memory Stack Frame	(U)	000007FD.BFFD4858	FFFFFFFF.98D80140	ORACLE+07648140
Memory Stack Frame	(U)	000007FD.BFFD4808	FFFFFFFF.98D81930	ORACLE+07649930
Memory Stack Frame	(U)	000007FD.BFFD4790	FFFFFFFF.98D423E0	ORACLE+0760A3E0
Register Stack Frame	(U)	000007FD.BFFD4738	FFFFFFFF.98D817E0	ORACLE+076497E0
Register Stack Frame	(U)	000007FD.BFFD46D0	FFFFFFFF.98BB76B0	ORACLE+0747F6B0
Memory Stack Frame	(U)	000007FD.BFFD4638	FFFFFFFF.98BBE580	ORACLE+07486580
Memory Stack Frame	(U)	000007FD.BFFD4568	FFFFFFFF.98BD3060	ORACLE+0749B060
Memory Stack Frame	(U)	000007FD.BFFD44D0	FFFFFFFF.92F1D5F0	ORACLE+017E55F0
Memory Stack Frame	(U)	000007FD.BFFD4418	FFFFFFFF.92EFF820	ORACLE+017C7820
Memory Stack Frame	(U)	000007FD.BFFD43B8	FFFFFFFF.93E1A1E0	ORACLE+026E21E0
Memory Stack Frame	(U)	000007FD.BFFD4340	FFFFFFFF.91D18A40	ORACLE+005E0A40
Memory Stack Frame	(U)	000007FD.BFFD42E8	FFFFFFFF.91D18380	ORACLE+005E0380
Memory Stack Frame	(U)	000007FD.BFFD4290	FFFFFFFF.904D4E80	PTHREAD\$RTL+7AE80
Memory Stack Frame	(U)	000007FD.BFFD4238	FFFFFFFF.9048A6C0	PTHREAD\$RTL+306C0
Memory Stack Frame	(U)	000007FD.BFFD4170	FFFFFFFF.80AAA6E0	SYS\$IMGSTA_C+00260
Base Frame	(U)	000007FD.BFFD40B8	FFFFFFFF.8059F770	PROCESS_MANAGEMENT+63E70

Detailed PC

```
SDA> prf start pc
PC Sampling started...
SDA> prf start coll
SDA> prf sho coll/thr=.1
PC Sampling Information (CPU_CYCLES):
```

Start VA	End VA	Image	Count	Percent
00000000.00000000	00000000.7ADBBFFF	Process Space	29	5.91%
FFFFFF802.89400000	FFFFFF802.89415FFF	Kernel Promote VA	3	0.61%
FFFFFFFF.80000000	FFFFFFFF.800000FF	SYS\$PUBLIC_VECTORS	2	0.41%
FFFFFFFF.80000100	FFFFFFFF.80013FFF	SYS\$BASE_IMAGE	2	0.41%
FFFFFFFF.80014000	FFFFFFFF.8005F1FF	SYS\$PLATFORM_SUPPORT	20	4.07%
FFFFFFFF.80110000	FFFFFFFF.802242FF	SYSTEM_PRIMITIVES_MIN	44	8.96%
FFFFFFFF.80224300	FFFFFFFF.8029F9FF	SYSTEM_SYNCHRONIZATION_MIN	37	7.54%
FFFFFFFF.802D4400	FFFFFFFF.802FB7FF	SYS\$EI1000.EXE	12	2.44%
FFFFFFFF.803AA400	FFFFFFFF.80470CFF	EXCEPTION	1	0.20%
FFFFFFFF.80470D00	FFFFFFFF.805470FF	IO_ROUTINES	3	0.61%
FFFFFFFF.80553900	FFFFFFFF.80664FFF	PROCESS_MANAGEMENT	25	5.09%
FFFFFFFF.80665000	FFFFFFFF.80754BFF	SYS\$VM	141	28.72%

...

00000000.00974B30	1	0.11%	PRF\$SDA+22B30	PRF\$SDA	00022B30
00000000.00978080	1	0.11%	PRF\$SDA+40080	PRF\$SDA	00040080
00000000.009805E0	4	0.44%	PRF\$SDA+485E0	PRF\$SDA	000485E0
00000000.009805F0	5	0.55%	PRF\$SDA+485F0	PRF\$SDA	000485F0
00000000.009805F1	9	0.99%	PRF\$SDA+485F1	PRF\$SDA	000485F1
00000000.00980600	1	0.11%	PRF\$SDA+48600	PRF\$SDA	00048600
00000000.00980610	2	0.22%	PRF\$SDA+48610	PRF\$SDA	00048610
00000000.00980620	3	0.33%	PRF\$SDA+48620	PRF\$SDA	00048620
00000000.00980630	1	0.11%	PRF\$SDA+48630	PRF\$SDA	00048630
00000000.00980631	1	0.11%	PRF\$SDA+48631	PRF\$SDA	00048631
00000000.00980640	1	0.11%	PRF\$SDA+48640	PRF\$SDA	00048640

Detailed IO

```
SDA> io load
```

```
IO$DEBUG load status = 00000001
```

```
SDA> io start trace
```

```
I/O Tracing started...
```

```
SDA> io sho tra
```

```
I/O Trace Information:
```

```
-----
```

Timestamp	CPU	IRP	SeqNum	UCB	Device	Oper	Function	Trace Buffer	Byte Cnt	Media
-----	---	-----	-----	-----	-----	-----	-----	-----	-----	-----
1-OCT 11:14:27.780613	00	B2CA05C0	304EDCEE	B244BB40	BG7290	BufIO	writelblk	FFFFFFFF.5D029B10	00000000	00580001
1-OCT 11:14:27.780503	00	B2CA05C0	304EDCEC	B24A4FC0	BG7294	BufIO	sensemode	FFFFFFFF.5D029A68	00000000	00040830
1-OCT 11:14:27.780487	01	B2909700	304EDCED	B249D040	FTA170	BufIO	unload	FFFFFFFF.5D0299F8	00000001	00010001
1-OCT 11:14:27.780419	01	B2909700	304EDBF6	B249D040	FTA170	BufIO	nop	FFFFFFFF.5D0298E0	0000000B	000A0001
1-OCT 11:14:27.780352	00	B2CA05C0	304EDCEB	B244BB40	BG7290	BufIO	readlblk	FFFFFFFF.5D029838	00000000	002303A4
1-OCT 11:14:27.780285	00	B2CA05C0	304EDCEA	B244BB40	BG7290	BufIO	readlblk	FFFFFFFF.5D029790	00000000	00240001
1-OCT 11:14:27.780238	00	B2CA05C0	304EDCE9	B244BB40	BG7290	BufIO	readlblk	FFFFFFFF.5D0296E8	00000000	00100001
1-OCT 11:14:27.780141	00	B2CA05C0	304EDCC3	B24A4FC0	BG7294	BufIO	sensemode	FFFFFFFF.5D029640	00000000	00010001
1-OCT 11:14:27.608078	01	B31B7640	304EDCDF	B2791E80	BG64	BufIO	sensemode	FFFFFFFF.5D029598	00000000	0000022C

Process IO

```
SDA> IO START COLLECT /PROCESS
```

```
...
```

```
SDA> IO SHOW COLLECT
```

```
Direct/Buffered IO Statistic Information: (collection running 1 seconds)
```

```
-----
```

PCB	EPID	Process Name	Current Main Image	Avg Io /Sec	DIO/Sec	BIO/Sec
-----	-----	-----	-----	-----	-----	-----
00000000	28800400	NULL		20.6	0.0	20.6
B2852600	28800473	MGR_MONITOR		9.3	0.2	9.1
B248D180	2880CA14	TCPIP\$SS_BG7290	TCPIP\$SSH_SSHD2	4.9	0.0	4.9
B28EBCC0	288004B1	ORA_SCI1_CKPT	ORACLE	1.3	1.3	0.0
B2894700	2880CA15	njl @ FTA170	SDA	1.3	0.1	1.2
B2782F80	2880042E	TCPIP\$NTP_1	TCPIP\$NTP	1.0	0.0	1.0
B27F14C0	28800442	NMBD	SAMBA\$NMBD	0.8	0.0	0.8
B285CE80	28800455	DBA_MONITOR		0.4	0.1	0.4
B2B0A700	2880C8DA	T42880C8CE_FCM	T4\$FC_MONITOR_NEW	0.3	0.3	0.0
B28E5A80	288004AC	ORA_SCI1_PMON	ORACLE	0.2	0.0	0.2

```
-----
```



Logical Names

- ◆ Not by itself a “Problem” but rather a hint

```
SDA> LNM LOAD
SDA> LNM START TRACE
...
SDA> LNM SHOW TRACE /SUMM
```

Logical Name Trace Information : (collection running 10 seconds)

Translation Rate/s	Peak Trnsln Rate/s	Logical Name
4198.6	6690.0	TZ
115.3	131.0	SYS\$DISK
99.9	111.0	APP_LOG
99.9	111.0	APP_LOG_DISK
94.4	100.0	DISK\$ZZ200_ALL
82.8	99.0	DISK\$200_202_ALL

RDB SDA Extension

```
RDB SHOW  ACTIVE_DB      - displays database with lock activity

RDB SHOW  PROCESS        - displays Rdb lock information for a given process
[/IDENTIFICATION=n] - process identified by its PID
[/INDEX=n]          - process identified by its index
[/ADDRESS=n]        - process identified by its PCB address
[/GRANTED]           - displays only granted locks
[/WAITING]           - displays only locks on the wait queue
                     (waiting I- and T-locks are ignored)
[/CONVERT]           - displays only locks on the conversion queue
[/VALBLK]            - decode and display lock value block information

RDB SHOW  CONTENTION      - monitors lock timeout queue for Rdb locks stalling
[/INTERVAL=n]          - interval check in seconds (fraction of second possible /INT=0.2)
```

AWR

- ◆ At regular intervals, database takes snapshot of vital statistics and workload information and stores them in AWR repository.
- ◆ AWRRPT to generate report

WORKLOAD REPOSITORY report for

DB Name	DB Id	Instance	Inst num	Startup Time	Release	RAC
APPL	108674384	appl	1	08-Nov-11 00:11	11.2.0.2.0	NO

Host Name	Platform	CPUs	Cores	Sockets	Memory (GB)
prometheus	Solaris[tm] OE (64-bit)	48	48	24	192.00

	Snap Id	Snap Time	Sessions	Cursors/Session
Begin Snap:	54196	14-Nov-11 08:30:42	3887	17.2
End Snap:	54197	14-Nov-11 09:00:50	4812	18.5
Elapsed:		30.13 (mins)		
DB Time:		938.48 (mins)		

Summary

- ◆ Interview
- ◆ Isolate
- ◆ Identify





Questions?



Thoughts?

Software
INTERNATIONAL
Concepts

Worldwide
Managed Services for
OpenVMS and Rdb

About Software Concepts

- ◆ Proven track record
 - ◆ Nearly 30 years supporting VMS & Rdb/DBMS
 - ◆ Actively managing over 100 databases
 - ◆ Remote VMS / DBA service since 1995
- ◆ International reputation
 - ◆ Leading provider of OpenVMS remote managed services
 - ◆ Core competencies in high-availability, high-performance, complex OpenVMS, Rdb and DBMS environments
- ◆ Headquartered in Nashua, NH (USA)

